SWAT

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Chapter 1

SWAT

An updated SWAT 2012 revision 670 code

Objectives

- Standard indentation and translation to Fortran 90 by using `findent`. See the translate-fortran90.pl perl script file (:heavy_check_mark:)
- Exhaustive use of the "implicit none" directive to detect bad variable usage (:heavy_check_mark:)
- Generate a GNU `Make` makefile and compile with GNU `GFortran`. See the gernerate-makefile.pl perl script file (:heavy_check_mark:)
- Remove non-used variables and format labels (:heavy_check_mark:)
- Detect and solve all uninitialized variables (:heavy_check_mark: :construction:, some proposed solutions could be incorrect)
- Remove unneeded variable initializations (:heavy_check_mark:) as:

```
j=0 !  this line is not necessary
j=ihru
```

- Remove redundant code (:heavy_check_mark:)
- Exhaustive use of the "parameter" directive on constants (:heavy_check_mark:)
- Generate a detailed list of issues detected in the original code (:heavy_check_mark:, see at the end of this README)
- Remove obsolete commented code (:x:)
- Update variable descriptions in comments (:construction:, a lot of work)
- Standardize comments by using Doxygen style in order to generate documentation. See at latex/refman.pdf (:construction:, a lot of work)

Required tools

- GFortran (to compile the source code)
- Make (to build the executable file)
- Perl (optional: to execute the perl scripts to update the makefile or to translate original files to Fortran 90)
- Findent (optional: to translate original files to Fortran 90 with a standard indentation)
- Doxygen (optional: to generate a reference programming manual from source code)
- TeX Live or MiKTeX (optional: to generate a reference programming manual from source code)
- On Microsoft Windows systems you have to install MSYS2 and the required utilities (GFortran and Make). You can follow detailed instructions in install-unix

Instructions to generate Fortran 90 style code from original code

In order to generate Fortran 90 style code with standard indentation from original code you have to type on a UNIX type terminal (you need Perl and Findent):

```
$ perl translate-fortran90.pl
```

Instructions to generate an initial GNU make Makefile

Type on the UNIX type terminal, when translated the original code to Fortran 90 style (you need Perl):

```
$ perl generate-makefile.pl
```

Instructions to generate an executable to test

Type on the UNIX type terminal (you need GFortran and Make)

- In UNIX type operative systems:

  ```
  $ make
  ```

- In a MSYS2 terminal in Microsoft Windows:

  ```
  $ EXE=".exe" LDFLAGS="-static" make
  ```

- Cross-compiling a 32 bits Microsoft Windows executable in a UNIX type operative system:

  ```
  $ prefix="i686-w64-mingw32-" EXE=".exe" LDFLAGS="-static" make
  ```

- Cross-compiling a 64 bits Microsoft Windows executable in a UNIX type operative system:

  ```
  $ prefix="x86\_64-w64-mingw32-" EXE=".exe" LDFLAGS="-static" make
  ```

Instructions to generate an optimized executable file

Type on the UNIX type terminal (you need GFortran and Make)

- In UNIX type operative systems:

  $ CFLAGS="-march=native -flto" LDFLAGS="-flto" make strip

- In a MSYS2 terminal in Microsoft Windows:

  $ EXE=".exe" CFLAGS="-flto" LDFLAGS="-flto -static" make strip

- Cross-compiling a 32 bits Microsoft Windows executable in a UNIX type operative system:

  $ prefix="i686-w64-mingw32-" EXE=".exe" CFLAGS="-flto" LDFLAGS="-flto -static" make strip

- Cross-compiling a 64 bits Microsoft Windows executable in a UNIX type operative system:

  $ prefix="x86_64-w64-mingw32-" EXE=".exe" CFLAGS="-flto" LDFLAGS="-flto -static" make strip

Instructions to generate a reference programming manual from source code

Type on the UNIX type terminal (you need Doxygen and TeX Live or MiKTeX):

$ doxygen
$ cd latex
$ make

The reference programming manual file latex/refman.pdf is generated from source code in PDF format

Issues in the original source code

This is a list of possible issues detected in the original source code. These issues have been mostly detected by the GFortran compiler warnings. Some of them could not arise because the logic of the variables is not possible.

- In biofilm.f:
  - "dcoef" is used but not initialized. `dcoef=3` as in watqual.f? Then, I propose at beginning: `real*8, parameter :: dcoef = 3.`
- In bmp_ri_pond.f:
  - "qseep" and "qet" could be used not initialized at lines 133 and 134. However the problem only arises for `nstep<1`
- In bmp_sand_filter.f:
  - "sed_removed" at line 342 could be used not initialized if `sfsedstdev<=0`
- In bpm_sed_pond.f:
  - `bmp_sed _pond` seems to be `bmp_sed_pond` at line 186

- In bmp_wet_pond.f:
  - "hvol" could be used not initialized in "ext_dpth" subroutine at line 267 in first bucle iteration
- In clicon.f:
  - "tmxbsb", "tmnbsb", "rbsb", "rstpbsb", "rhdbsb", "rabsb", "rmxbsb", "daylbsb", "fradbsb" and "u10bsb" could be used not initialized at 186-207 lines
- In conapply.f:
  - "k" and "kk" could be used not initialized at 121-122 lines if `iday_pest(j)/=ipst_freq(j)` and `curyr>nyskip`
- In confert.f:
  - "ifrt" seems to be "it" at line 214
- In curno.f:
  - "smxold" could be used not initialized if `cn1(h)<=1.e-6` and `curyr/=0` at line 96
- In drains.f:
  - "nlayer" could be used not initialized at line 23. However, the problem only arises if it is not set in the previous bucle (`mlyr<=1` or `sol_z(j1,j)<=0`)
- In etact.f:
  - "sev" could be used not initialized at line 286 if `dep>=esd` and `ly==2`
- In filter.f:
  - "remove21" seems to be "remove2" at line 316
- In grass_wway.f:
  - "sf_depth" and "sf_sed" could be used not initialized at lines 133 and 137 if `sf_area>0` and `sf_area<=1.e-6`
- In hhnoqual.f:
  - "algon" seems to be "algcon" at line 190
- In hhwatqual.f
  - "orgnpin" seems to be "orgpin" at line 278
  - `thour=1.0` at line 377 overwrites previous "thour" calculation. It is wrong
- In hmeas.f:
  - "rhdbsb" could be used not initialized at line 84
- In killop.f:
  - "ff1" and "ff2" are used but not initialized at lines 167 and 267. They are set in harvkillop.f file (lines 257-258). They have to be included in modparm.f to share harvkillop.f values? or they have to be redefined as in harvkillop.f?
- In NCsed_leach.f90:
  - "perc_clyr" could be used not initialized at line 221 if `sol_nly(j)<2`
- In nrain.f:
  - "no2pcp" seems to be "no3pcp" at line 72
- In pmeas.f:

  - "rbsb" could be used not initialized at line 143
  - "flag" could be used not initialized if 'a==' 'at line 210
  - "rainsb" could be used not initialized, however only ifnstep<=0`
- In pminrl2.f:
  - at line 95 a comma is necessary between "base" and "vara"
  - "ssp" could be used not initialized at line 196 if xx<=1.e-6
- In pothole.f:
  - "solp_tileo" could be used not initialized at line 593 if pot_vol(j)<=1.e-6 or potvol_↩ tile<=1.e-6
- In potholehr.f:
  - "potflow" seems to be "potflwo" at line 447
- In readatmodep.f:
  - momax=12*nbyr is defined at line 65 but not used. It has to be "mo_max"? but then, it overwrites the file read
- In readops.f:
  - year = 0. seems to be iyear = 0 at line 98
  - "mg13" seems to be "mgt13" at line 206
- In readpnd.f:
  - "vselsetlpnd" seems to be "velsetlpnd" at line 279
- In readru.f:
  - "tck" is used but not initialized at line 79
- In readsepticbz.f:
  - at line 135 4. e-8 seems to be 4.e-8
- In rewind_init.f:
  - "orig_tnylda" is used but not initialized at line 174
- In routels.f:
  - "dstor" is used but not initialized at line 134. It has to be calculated as in watbal.f? or as in the commented line 109?
  - "latqout" and "gwqout" could be used not initialized at lines 142-143
- In rtbact.f:
  - "netwtr" could be used not initialized at line 124, however only if nstep<1
- In rthpest.f:
  - thour=1.0 at line 183 overwrites previous "thour" calculation. It is wrong
  - "frsol" and "frsrb" could be used not initialized at lines 289-290 if hrtwtr(ii)>0.001 and hrtwtr(ii)/(idt*60)<=0.01
- In rtpest.f:
  - tday=1.0 at line 180 overwrites previous "tday" calculation. It is wrong
- In sched_mgt.f:
  - < = seems to be <= at 202 line

  - "husc" and "igrow" at lines 264-265 are used but not initialized. "husc" has to be `phu_op(iop,ihru)` has in readmgt.f? "igrow" has to be `igro(ihru)` has in readmgt.f?

- In smeas.f:
  - "rabsb" could be used not initialized at line 86
- In sweep.f:
  - "fr_curb" is used but not initialized at line 56. It has to be added to modparm.f to share result with sched_mgt.f? or it has to be `mgt5op(nop(ihru),ihru)` as in sched_mgt.f?
- In tmeas.f:
  - "tmxbsb" and "tmnbsb" could be used not initialized at lines 109-110
- In transfer.f:
  - "ratio", "xx" and "ratio1" could be used not initialized at lines 236, 239 and 241 if `ihout==2`
- In wmeas.f:
  - "u10bsb" could be used not initialized at line 85
- In zero0.f:
  - "sol_sumn03" seems to be "sol_sumno3" at line 508
- In zero_urbn.f:
  - "stp_stagdis" seems to be "dtp_stagdis" at line 84
  - "subdr_kg" seems to be "subdr_km" at line 149
  - "spl_eros" is not defined at line 21, it could be "eros_spl"?

Chapter 2

Modules Index

2.1 Modules List

Here is a list of all documented modules with brief descriptions:

parm
Main module containing the global variables 13

Chapter 3

Data Type Index

3.1 Data Types List

Here are the data types with brief descriptions:

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4.1 File List

Here is a list of all documented files with brief descriptions:

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This subroutine allocates array sizes . . . 73
ascrv.f90 . . . 73
aunif.f90
This function generates random numbers ranging from 0.0 to 1.0 . . . 74
caps.f90
This subroutine reads the input and output names given in file.cio and converts all capital letters to lowercase letters . . . 74
gcycl.f90
This subroutine initializes the random number seeds. If the user desires a different set of random numbers for each simulation run, the random number generator is used to reset the values of the seeds . . . 75
getallo.f90
This subroutine calculates the number of HRUs, subbasins, etc. in the simulation. These values are used to allocate array sizes . . . 75
jdt.f90 . . . 76
main.f90 . . . 77
modparm.f90 . . . 77
readbsn.f90
This subroutine reads data from the basin input file (.bsn). This file contains information related to processes modeled or defined at the watershed level . . . 132
readfcst.f90
This subroutine reads the HRU forecast weather generator parameters from the .cst file . . . 132
readfert.f90 . . . 133
readfig.f90 . . . 133
readfile.f90
This subroutine opens the main input and output files and reads watershed information from the file.cio . . . 133
readlup.f90 . . . 134
readpest.f90 . . . 134
readplant.f90 . . . 135
readsepticbz.f90 . . . 135
readtill.f90 . . . 135
readurban.f90 . . . 136

readwwq.f90
This subroutine reads the watershed stream water quality input data (.wwq file) and initializes the QUAL2E variables which apply to the entire watershed 136
simulate.f90
This subroutine contains the loops governing the modeling of processes in the watershed . . . 136

Chapter 5

Module Documentation

5.1 parm Module Reference

main module containing the global variables

Data Types

- interface ascrv
- interface atri
- interface aunif
- interface dstn1
- interface ee
- interface expo
- interface fcgd
- interface HQDAV
- interface layersplit
- interface ndenit
- interface qman
- interface regres
- interface rsedaa
- interface tair
- interface theta
- interface vbl

Variables

- integer, parameter mvaro = 33

  max number of variables routed through the reach
- integer, parameter mhruo = 79

  max number of variables in output.hru
- integer, parameter mrcho = 62

  max number of variables in reach file
- integer, parameter msubo = 24

  max number of variables in output.sub
- integer, parameter mstdo = 113

max number of variables summarized in output.std

- integer, parameter **motot** = 600
- integer **icalen**
- real ∗8 prf_bsn

  Basinwide peak rate adjustment factor for sediment routing in the channel. Allows impact of peak flow rate on sediment routing and channel reshaping to be taken into account.
- real ∗8 **co2_x2**
- real ∗8 **co2_x**
- real ∗8, dimension(:), allocatable **alph_e**
- real ∗8, dimension(:), allocatable cdn

  denitrification exponential rate coefficient
- real ∗8, dimension(:), allocatable nperco

  nitrate percolation coefficient (0-1)
  0:concentration of nitrate in surface runoff is zero
  1:percolate has same concentration of nitrate as surface runoff
- real ∗8, dimension(:), allocatable surlag

  Surface runoff lag time. This parameter is needed in subbasins where the time of concentration is greater than 1 day. SURLAG is used to create a "storage" for surface runoff to allow the runoff to take longer than 1 day to reach the subbasin outlet (days)
- real ∗8, dimension(:), allocatable **co_p**
- real ∗8, dimension(:), allocatable cmn

  rate factor for humus mineralization on active organic N
- real ∗8, dimension(:), allocatable phoskd

  Phosphorus soil partitioning coefficient. Ratio of soluble phosphorus in surface layer to soluble phosphorus in runoff.
- real ∗8, dimension(:), allocatable psp

  Phosphorus availibility index. The fraction of fertilizer P remaining in labile pool after initial rapid phase of P sorption.
- real ∗8, dimension(:), allocatable sdnco

  denitrification threshold: fraction of field capacity triggering denitrification
- real ∗8 r2adj_bsn

  basinwide retention parameter adjustment factor (greater than 1)
- real ∗8 **yield**
- real ∗8 **burn_frlb**
- real ∗8 **pst_kg**
- real ∗8 **yieldgrn**
- real ∗8 **yieldbms**
- real ∗8 **yieldtbr**
- real ∗8 **yieldn**
- real ∗8 **yieldp**
- real ∗8 **hi_bms**
- real ∗8 **hi_rsd**
- real ∗8 **yieldrsd**
- real ∗8, dimension(:), allocatable **l_k1**
- real ∗8, dimension(:), allocatable **l_k2**
- real ∗8, dimension(:), allocatable **l_lambda**
- real ∗8, dimension(:), allocatable **l_beta**
- real ∗8, dimension(:), allocatable **l_gama**
- real ∗8, dimension(:), allocatable **l_harea**
- real ∗8, dimension(:), allocatable **l_vleng**
- real ∗8, dimension(:), allocatable **l_vslope**
- real ∗8, dimension(:), allocatable **l_ktc**
- real ∗8, dimension(:), allocatable **biofilm_mumax**
- real ∗8, dimension(:), allocatable **biofilm_kinv**
- real ∗8, dimension(:), allocatable **biofilm_klw**
- real ∗8, dimension(:), allocatable **biofilm_kla**

- real ∗8, dimension(:), allocatable **biofilm_cdet**
- real ∗8, dimension(:), allocatable **biofilm_bm**
- real ∗8, dimension(:,:), allocatable **hru_rufr**
- real ∗8, dimension(:,:), allocatable **daru_km**
- real ∗8, dimension(:,:), allocatable **ru_k**
- real ∗8, dimension(:,:), allocatable **ru_c**
- real ∗8, dimension(:,:), allocatable **ru_eiq**
- real ∗8, dimension(:,:), allocatable **ru_ovsl**
- real ∗8, dimension(:,:), allocatable **ru_a**
- real ∗8, dimension(:,:), allocatable **ru_ovs**
- real ∗8, dimension(:,:), allocatable **ru_ktc**
- real ∗8, dimension(:), allocatable **gwq_ru**
- real ∗8, dimension(:), allocatable **qdayout**
- integer, dimension(:), allocatable **ils2**
- integer, dimension(:), allocatable **ils2flag**
- integer **iru**
- integer **mru**
- integer **irch**
- integer **isub**
- integer **idum**
- integer **mhyd_bsn**
- integer **ipest**
- integer **ils_nofig**
- integer **mhru1**
- integer, dimension(:), allocatable **mhyd1**
- integer, dimension(:), allocatable **irtun**
- real ∗8 **wshd_sepno3**
- real ∗8 **wshd_sepnh3**
- real ∗8 **wshd_seporgn**
- real ∗8 **wshd_sepfon**
- real ∗8 **wshd_seporgp**
- real ∗8 **wshd_sepfop**
- real ∗8 **wshd_sepsolp**
- real ∗8 **wshd_sepbod**
- real ∗8 **wshd_sepmm**
- integer, dimension(:), allocatable **isep_hru**
- real ∗8 fixco

  nitrogen fixation coefficient
- real ∗8 nfixmx

  maximum daily n-fixation (kg/ha)
- real ∗8 res_stlr_co

  reservoir sediment settling coefficient
- real ∗8 rsd_covco

  residue cover factor for computing frac of cover
- real ∗8 vcrit

  critical velocity
- real ∗8 **wshd_sw**
- real ∗8 **wshd_snob**
- real ∗8 **wshd_pndfr**
- real ∗8 **wshd_pndv**
- real ∗8 **wshd_pndsed**
- real ∗8 percop

pesticide percolation coefficient (0-1)
0: concentration of pesticide in surface runoff is zero
1: percolate has same concentration of pesticide as surface runoff

- real ∗8 **wshd_wetfr**
- real ∗8 **wshd_resfr**
- real ∗8 **wshd_resha**
- real ∗8 **wshd_pndha**
- real ∗8 **wshd_fminp**
- real ∗8 **wshd_ftotn**
- real ∗8 **wshd_fnh3**
- real ∗8 **wshd_fno3**
- real ∗8 **wshd_forgn**
- real ∗8 **wshd_forgp**
- real ∗8 **wshd_ftotp**
- real ∗8 **wshd_yldn**
- real ∗8 **wshd_yldp**
- real ∗8 **wshd_fixn**
- real ∗8 **wshd_pup**
- real ∗8 **wshd_wstrs**
- real ∗8 **wshd_nstrs**
- real ∗8 **wshd_pstrs**
- real ∗8 **wshd_tstrs**
- real ∗8 **wshd_astrs**
- real ∗8 ffcb

  initial soil water content expressed as a fraction of field capacity
- real ∗8 **wshd_hmn**
- real ∗8 **wshd_rwn**
- real ∗8 **wshd_hmp**
- real ∗8 **wshd_rmn**
- real ∗8 **wshd_dnit**
- real ∗8 wdpq

  die-off factor for persistent bacteria in soil solution (1/day)
- real ∗8 **wshd_rmp**
- real ∗8 **wshd_voln**
- real ∗8 **wshd_nitn**
- real ∗8 **wshd_pas**
- real ∗8 **wshd_pal**
- real ∗8 wof_p

  wash off fraction for persistent bacteria on foliage during a rainfall event
- real ∗8 **wshd_plch**
- real ∗8 **wshd_raino3**
- real ∗8 **ressedc**
- real ∗8 **basno3f**
- real ∗8 **basorgnf**
- real ∗8 **wshd_pinlet**
- real ∗8 **wshd_ptile**
- real ∗8 sftmp

  Snowfall temperature (deg C)
- real ∗8 smfmn

  Minimum melt rate for snow during year (Dec. 21) where deg C refers to the air temperature. (mm/deg C/day)
- real ∗8 smfmx

  Maximum melt rate for snow during year (June 21) where deg C refers to the air temperature. SMFMX and SM↩ FMN allow the rate of snow melt to vary through the year. These parameters are accounting for the impact of soil temperature on snow melt. (mm/deg C/day)

- real ∗8 smtmp

  Snow melt base temperature. Mean air temperature at which snow melt will occur. (deg C)
- real ∗8 wgpq

  growth factor for persistent bacteria in soil solution (1/day)
- real ∗8 **basminpf**
- real ∗8 **basorgpf**
- real ∗8 wdlpq

  die-off factor for less persistent bacteria in soil solution (1/day)
- real ∗8 **wshd_resv**
- real ∗8 **wshd_ressed**
- real ∗8 **basno3i**
- real ∗8 **basorgni**
- real ∗8 **basminpi**
- real ∗8 wdps

  die-off factor for persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 wglpq

  growth factor for less persistent bacteria in soil solution (1/day)
- real ∗8 **basorgpi**
- real ∗8 **peakr**
- real ∗8 **pndsedin**
- real ∗8 **sw_excess**
- real ∗8 **albday**
- real ∗8 timp

  Snow pack temperature lag factor (0-1)
  1 = no lag (snow pack temp=current day air temp) as the lag factor goes to zero, the snow pack's temperature will be less influenced by the current day's air temperature.
- real ∗8 **wtabelo**
- real ∗8 **tilep**
- real ∗8 **wt_shall**
- real ∗8 **sq_rto**
- real ∗8 **tloss**
- real ∗8 **inflpcp**
- real ∗8 **snomlt**
- real ∗8 **snofall**
- real ∗8 **fixn**
- real ∗8 **qtile**
- real ∗8 **crk**
- real ∗8 **latlyr**
- real ∗8 **pndloss**
- real ∗8 **wetloss**
- real ∗8 **potloss**
- real ∗8 **lpndloss**
- real ∗8 **lwetloss**
- real ∗8 **sedrch**
- real ∗8 **fertn**
- real ∗8 **sol_rd**
- real ∗8 **cfertn**
- real ∗8 **cfertp**
- real ∗8 **sepday**
- real ∗8 **bioday**
- real ∗8 **sepcrk**
- real ∗8 **sepcrktot**
- real ∗8 **fertno3**
- real ∗8 **fertnh3**

- real ∗8 **fertorgn**
- real ∗8 **fertsolp**
- real ∗8 **fertorgp**
- real ∗8 wgps

  growth factor for persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 **fertp**
- real ∗8 **grazn**
- real ∗8 **grazp**
- real ∗8 **soxy**
- real ∗8 **qdfr**
- real ∗8 **sdti**
- real ∗8 **rtwtr**
- real ∗8 **ressa**
- real ∗8 wdlps

  die-off factor for less persistent bacteria absorbed to soil particles (1/day)
- real ∗8 wglps

  growth factor for less persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 da_km

  area of the watershed in square kilometers (km^ 2)
- real ∗8 **rttime**
- real ∗8 **rchdep**
- real ∗8 **rtevp**
- real ∗8 **rttlc**
- real ∗8 **resflwi**
- real ∗8 wdprch

  die-off factor for persistent bacteria in streams (1/day)
- real ∗8 **resflwo**
- real ∗8 **respcp**
- real ∗8 **resev**
- real ∗8 **ressep**
- real ∗8 **ressedi**
- real ∗8 **ressedo**
- real ∗8 **dtot**
- real ∗8 pperco_bsn

  phosphorus percolation coefficient. Ratio of soluble phosphorus in surface to soluble phosphorus in percolate
- real ∗8 nperco_bsn

  basin nitrate percolation coefficient (0-1)
  0:concentration of nitrate in surface runoff is zero
  1:percolate has same concentration of nitrate as surface runoff
- real ∗8 rsdco

  residue decomposition coefficient. The fraction of residue which will decompose in a day assuming optimal moisture, temperature, C:N ratio, and C:P ratio
- real ∗8 **phoskd_bsn**
- real ∗8 **voltot**
- real ∗8 msk_x

  weighting factor controling relative importance of inflow rate and outflow rate in determining storage on reach
- real ∗8 **volcrmin**
- real ∗8 bactkdq

  bacteria soil partitioning coefficient. Ratio of solution bacteria in surface layer to solution bacteria in runoff soluble and sorbed phase in surface runoff.
- real ∗8 wdpf

  die-off factor for persistent bacteria on foliage (1/day)
- real ∗8 **uno3d**

- real ∗8 **canev**
- real ∗8 **usle**
- real ∗8 **rcn**
- real ∗8 **surlag_bsn**
- real ∗8 **precipday**
- real ∗8 thbact

  temperature adjustment factor for bacteria die-off/growth
- real ∗8 wlpq20

  overall rate change for less persistent bacteria in soil solution (1/day)
- real ∗8 wlps20

  overall rate change for less persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 wpq20

  overall rate change for persistent bacteria in soil solution (1/day)
- real ∗8 wps20

  overall rate change for persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 **bactrop**
- real ∗8 **bactsedp**
- real ∗8 wgpf

  growth factor for persistent bacteria on foliage (1/day)
- real ∗8 **bactlchp**
- real ∗8 **bactlchlp**
- real ∗8 **enratio**
- real ∗8 **wetpcp**
- real ∗8 **pndpcp**
- real ∗8 **wetsep**
- real ∗8 **pndsep**
- real ∗8 **wetev**
- real ∗8 **pndev**
- real ∗8 **pndsedo**
- real ∗8 **wetsedo**
- real ∗8 **pndflwi**
- real ∗8 **wetflwi**
- real ∗8 **pndflwo**
- real ∗8 **wetflwo**
- real ∗8 **wetsedi**
- real ∗8 **da_ha**
- real ∗8 **vpd**
- real ∗8 evlai

  leaf area index at which no evaporation occurs. This variable is used in ponded HRUs where evaporation from the water surface is restricted by the plant canopy cover. Evaporation from the water surface equals potential ET when LAI = 0 and decreased linearly to O when LAI = EVLAI
- real ∗8 evrch

  Reach evaporation adjustment factor. Evaporation from the reach is multiplied by EVRCH. This variable was created to limit the evaporation predicted in arid regions.
- real ∗8 wdlpf

  die-off factor for less persistent bacteria on foliage (1/day)
- real ∗8 **bactrolp**
- real ∗8 **bactsedlp**
- real ∗8 **pet_day**
- real ∗8 **ep_day**
- real ∗8 adj_pkr

  peak rate adjustment factor in the subbasin. Used in the MUSLE equation to account for impact of peak flow on erosion.
- real ∗8 n_updis

nitrogen uptake distribution parameter. This parameter controls the amount of nitrogen removed from the different soil layer layers by the plant. In particular, this parameter allows the amount of nitrogen removed from the surface layer via plant uptake to be controlled. While the relationship between UBN and N removed from the surface layer is affected by the depth of the soil profile, in general, as UBN increases the amount of N removed from the surface layer relative to the amount removed from the entire profile increases

- real ∗8 nactfr

  nitrogen active pool fraction. The fraction of organic nitrogen in the active pool.

- real ∗8 p_updis

  phosphorus uptake distribution parameter This parameter controls the amount of phosphorus removed from the different soil layers by the plant. In particular, this parameter allows the amount of phosphorus removed from the surface layer via plant uptake to be controlled. While the relationship between UBP and P uptake from the surface layer is affected by the depth of the soil profile, in general, as UBP increases the amount of P removed from the surface layer relative to the amount removed from the entire profile increases

- real ∗8 **snoev**
- real ∗8 **sno3up**
- real ∗8 **reactw**
- real ∗8 **sdiegropq**
- real ∗8 **sdiegrolpq**
- real ∗8 **sdiegrops**
- real ∗8 **sdiegrolps**
- real ∗8 **es_day**
- real ∗8 wof_lp

  wash off fraction for less persistent bacteria on foliage during a rainfall event

- real ∗8 **sbactrop**
- real ∗8 **sbactrolp**
- real ∗8 **sbactsedp**
- real ∗8 **sbactsedlp**
- real ∗8 **ep_max**
- real ∗8 **sbactlchp**
- real ∗8 **sbactlchlp**
- real ∗8 **psp_bsn**
- real ∗8 **rchwtr**
- real ∗8 **resuspst**
- real ∗8 **setlpst**
- real ∗8 **bsprev**
- real ∗8 **bssprev**
- real ∗8 **spadyo**
- real ∗8 **spadyev**
- real ∗8 **spadysp**
- real ∗8 **spadyrfv**
- real ∗8 **spadyosp**
- real ∗8 **qday**
- real ∗8 **usle_ei**
- real ∗8 **al5**
- real ∗8 **pndsedc**
- real ∗8 **no3pcp**
- real ∗8 **rcharea**
- real ∗8 **volatpst**
- real ∗8 ubw

  water uptake distribution parameter. This parameter controls the amount of water removed from the different soil layers by the plant. In particular, this parameter allows the amount of water removed from the surface layer via plant uptake to be controlled. While the relationship between UBW and H2O removed from the surface layer is affected by the depth of the soil profile, in general, as UBW increases the amount of water removed from the surface layer relative to the amount removed from the entire profile increases

- real ∗8 uobn

nitrogen uptake normalization parameter. This variable normalizes the nitrogen uptake so that the model can easily verify that upake from the different soil layers sums to 1.0

- real ∗8 uobp

  phosphorus uptake normalization parameter. This variable normalizes the phosphorus uptake so that the model can easily verify that uptake from the different soil layers sums to 1.0
- real ∗8 uobw

  water uptake normalization parameter. This variable normalizes the water uptake so that the model can easily verify that uptake from the different soil layers sums to 1.0
- real ∗8 wglpf

  growth factor for less persistent bacteria on foliage (1/day)
- real ∗8 **wetsedc**
- real ∗8 **respesti**
- real ∗8 rcor

  correction coefficient for generated rainfall to ensure that the annual means for generated and observed values are comparable (needed only if IDIST=1)
- real ∗8 rexp

  value of exponent for mixed exponential rainfall distribution (needed only if IDIST=1)
- real ∗8 snocov1

  1st shape parameter for snow cover equation. This parameter is determined by solving the equation for 50% snow cover
- real ∗8 snocov2

  2nd shape parameter for snow cover equation. This parameter is determined by solving the equation for 95% snow cover
- real ∗8 snocovmx

  Minimum snow water content that corresponds to 100% snow cover. If the snow water content is less than SNOC↩ OVMX, then a certain percentage of the ground will be bare (mm H2O)
- real ∗8 **lyrtile**
- real ∗8 **lyrtilex**
- real ∗8 sno50cov

  Fraction of SNOCOVMX that corresponds to 50% snow cover. SWAT assumes a nonlinear relationship between snow water and snow cover.
- real ∗8 ai0

  ratio of chlorophyll-a to algal biomass (ug chla/mg alg)
- real ∗8 ai1

  fraction of algal biomass that is nitrogen (mg N/mg alg)
- real ∗8 ai2

  fraction of algal biomass that is phosphorus (mg P/mg alg)
- real ∗8 ai3

  the rate of oxygen production per unit of algal photosynthesis (mg O2/mg alg)
- real ∗8 ai4

  the rate of oxygen uptake per unit of algae respiration (mg O2/mg alg)
- real ∗8 ai5

  the rate of oxygen uptake per unit of NH3 nitrogen oxidation (mg O2/mg N)
- real ∗8 ai6

  the rate of oxygen uptake per unit of NO2 nitrogen oxidation (mg O2/mg N)
- real ∗8 rhoq

  algal respiration rate (1/day or 1/hr)
- real ∗8 tfact

  fraction of solar radiation computed in the temperature heat balance that is photosynthetically active
- real ∗8 k_l

  half-saturation coefficient for light (MJ/(m2∗hr))
- real ∗8 k_n

  michaelis-menton half-saturation constant for nitrogen (mg N/L)

- real ∗8 k_p

  michaelis-menton half saturation constant for phosphorus (mg P/L)
- real ∗8 lambda0

  non-algal portion of the light extinction coefficient (1/m)
- real ∗8 lambda1

  linear algal self-shading coefficient (1/(m∗ug chla/L))
- real ∗8 lambda2

  nonlinear algal self-shading coefficient ((1/m)(ug chla/L)∗∗(-2/3))
- real ∗8 mumax

  maximum specific algal growth rate (1/day or 1/hr)
- real ∗8 p_n

  algal preference factor for ammonia
- real ∗8 **rnum1**
- real ∗8 **autop**
- real ∗8 **auton**
- real ∗8 **etday**
- real ∗8 **hmntl**
- real ∗8 **rwntl**
- real ∗8 **hmptl**
- real ∗8 **rmn2tl**
- real ∗8 **rmptl**
- real ∗8 **wdntl**
- real ∗8 **cmn_bsn**
- real ∗8 **rmp1tl**
- real ∗8 **roctl**
- real ∗8 **gwseep**
- real ∗8 **revapday**
- real ∗8 **reswtr**
- real ∗8 wdlprch

  die-off factor for less persistent bacteria in streams (1/day)
- real ∗8 wdpres

  die-off factor for persistent bacteria in reservoirs (1/day)
- real ∗8 **bury**
- real ∗8 **difus**
- real ∗8 **reactb**
- real ∗8 **solpesto**
- real ∗8 **petmeas**
- real ∗8 wdlpres

  die-off factor for less persistent bacteria in reservoirs (1/day)
- real ∗8 **sorpesto**
- real ∗8 **spcon_bsn**
- real ∗8 **spexp_bsn**
- real ∗8 **solpesti**
- real ∗8 **sorpesti**
- real ∗8 msk_co1

  calibration coefficient to control impact of the storage time constant for the reach at bankfull depth (phi(10,:) upon the storage time constant for the reach used in the Muskingum flow method
- real ∗8 msk_co2

  calibration coefficient to control impact of the storage time constant for the reach at 0.1 bankfull depth (phi(13,:) upon the storage time constant for the reach used in the Muskingum flow method
- real ∗8 **snoprev**
- real ∗8 **swprev**
- real ∗8 **shallstp**

- real ∗8 **deepstp**
- real ∗8 **ressolpo**
- real ∗8 **resorgno**
- real ∗8 **resorgpo**
- real ∗8 **resno3o**
- real ∗8 **reschlao**
- real ∗8 **resno2o**
- real ∗8 **resnh3o**
- real ∗8 **qdbank**
- real ∗8 **potpcpmm**
- real ∗8 **potevmm**
- real ∗8 **potsepmm**
- real ∗8 **potflwo**
- real ∗8 bactminlp

  Threshold detection level for less persistent bacteria. When bacteria levels drop to this amount the model considers bacteria in the soil to be insignificant and sets the levels to zero (cfu/m^ 2)
- real ∗8 bactminp

  Threshold detection level for persistent bacteria. When bacteria levels drop to this amount the model considers bacteria in the soil to be insignificant and sets the levels to zero (cfu/m^ 2)
- real ∗8 trnsrch

  fraction of transmission losses from main channel that enter deep aquifer
- real ∗8 wp20p_plt

  overall rate change for persistent bacteria on foliage (1/day)
- real ∗8 **potsedo**
- real ∗8 **pest_sol**
- real ∗8 bact_swf

  fraction of manure containing active colony forming units (cfu)
- real ∗8 bactmx

  bacteria percolation coefficient. Ratio of solution bacteria in surface layer to solution bacteria in percolate
- real ∗8 cncoef

  plant ET curve number coefficient
- real ∗8 wp20lp_plt

  overall rate change for less persistent bacteria on foliage (1/day)
- real ∗8 **cdn_bsn**
- real ∗8 **sdnco_bsn**
- real ∗8 **bactmin**
- real ∗8 cn_froz

  drainge coefficient (mm day -1)
- real ∗8 dorm_hr

  time threshold used to define dormant (hours)
- real ∗8 smxco

  adjustment factor for max curve number s factor (0-1)
- real ∗8 tb_adj

  adjustment factor for subdaily unit hydrograph basetime
- real ∗8 chla_subco

  regional adjustment on sub chla_a loading (fraction)
- real ∗8 depimp_bsn

  depth to impervious layer. Used to model perched water tables in all HRUs in watershed (mm)
- real ∗8 ddrain_bsn

  depth to the sub-surface drain (mm)
- real ∗8 tdrain_bsn

  time to drain soil to field capacity (hours)

- real ∗8 **gdrain_bsn**
- real ∗8 **rch_san**
- real ∗8 **rch_sil**
- real ∗8 **rch_cla**
- real ∗8 **rch_sag**
- real ∗8 **rch_lag**
- real ∗8 **rch_gra**
- real ∗8 hlife_ngw_bsn

  Half-life of nitrogen in groundwater? (days)
- real ∗8 **ch_opco_bsn**
- real ∗8 **ch_onco_bsn**
- real ∗8 decr_min

  Minimum daily residue decay.
- real ∗8 rcn_sub_bsn

  Concentration of nitrogen in the rainfall (mg/kg)
- real ∗8 **bc1_bsn**
- real ∗8 **bc2_bsn**
- real ∗8 **bc3_bsn**
- real ∗8 **bc4_bsn**
- real ∗8 **anion_excl_bsn**
- real ∗8, dimension(:), allocatable **wat_tbl**
- real ∗8, dimension(:), allocatable **sol_swpwt**
- real ∗8, dimension(:,:), allocatable **vwt**
- real ∗8 re_bsn

  Effective radius of drains (range 3.0 - 40.0) (mm)
- real ∗8 sdrain_bsn

  Distance bewtween two drain or tile tubes (range 7600.0 - 30000.0) (mm)
- real ∗8 **sstmaxd_bsn**
- real ∗8 drain_co_bsn

  Drainage coeffcient (range 10.0 - 51.0) (mm-day-1)
- real ∗8 latksatf_bsn

  Multiplication factor to determine lateral ksat from SWAT ksat input value for HRU (range 0.01 - 4.0)
- real ∗8 pc_bsn

  Pump capacity (def val = 1.042 mm h-1 or 25 mm day-1) (mm h-1)
- integer **i_subhw**
- integer **imgt**
- integer **idlast**
- integer **iwtr**
- integer **ifrttyp**
- integer **mo_atmo**
- integer **mo_atmo1**
- integer **ifirstatmo**
- integer **iyr_atmo**
- integer **iyr_atmo1**
- integer **matmo**
- integer mch

  maximum number of channels
- integer mcr

  maximum number of crops grown per year
- integer mcrdb

  maximum number of crops/landcover in database file (crop.dat)
- integer mfcst

  maximum number of forecast stations

- integer mfdb

  max number of fertilizers in fert.dat
- integer mhru

  maximum number of HRUs in watershed
- integer mhyd

  maximum number of hydrograph nodes
- integer mpdb

  max number of pesticides in pest.dat
- integer mrg

  max number of rainfall/temp gages
- integer mcut

  maximum number of cuttings per year
- integer mgr

  maximum number of grazings per year
- integer mnr

  max number of years of rotation
- integer myr

  max number of years of simulation
- integer isubwq

  subbasin water quality code
  0 do not calculate algae/CBOD 1 calculate algae/CBOD drainmod tile equations
- integer **ffcst**
- integer isproj

  special project code: 1 test rewind (run simulation twice)
- integer nbyr

  number of calendar years simulated
- integer irte

  water routing method:
  0 variable storage method
  1 Muskingum method
- integer nrch

  number of reaches in watershed (none)
- integer nres

  number of reservoirs in watershed (none)
- integer **nhru**
- integer **mo**
- integer **immo**
- integer **i_mo**
- integer wndsim

  wind speed input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin
- integer ihru

  HRU number (none)
- integer **icode**
- integer **ihout**
- integer **inum1**
- integer **inum2**
- integer **inum3**
- integer **inum4**
- integer icfac

icfac = 0 for C-factor calculation using Cmin (as described in manual)
= 1 for new C-factor calculation from RUSLE (no minimum needed)

- integer **inum5**
- integer **inum6**
- integer **inum7**
- integer **inum8**
- integer mrech

  maximum number of rechour files
- integer nrgage

  number of raingage files
- integer nrgfil

  number of rain gages per file
- integer nrtot

  total number of rain gages
- integer ntgage

  number of temperature gage files
- integer ntgfil

  number of temperature gages per file
- integer nttot

  total number of temperature gages
- integer tmpsim

  temperature input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin
- integer icrk

  crack flow code
  1: compute flow in cracks
- integer irtpest

  number of pesticide to be routed through the watershed
- integer igropt

  Qual2E option for calculating the local specific growth rate of algae
  1: multiplicative.
- integer lao

  Qual2E light averaging option. Qual2E defines four light averaging options. The only option currently available in SWAT is #2.
- integer **npmx**
- integer **curyr**
- integer **iihru**
- integer itdrn

  tile drainage equations flag/code
  1 simulate tile flow using subroutine drains(wt_shall)
  0 simulate tile flow using subroutine origtile(wt_shall,d)
- integer iwtdn

  water table depth algorithms flag/code
  1 simulate wt_shall using subroutine new water table depth routine
  0 simulate wt_shall using subroutine original water table depth routine
- integer ismax

  maximum depressional storage selection flag/code
  0 = static depressional storage
  1 = dynamic storage based on tillage and cumulative rainfall
- integer iroutunit

  not being implemented in this version drainmod tile equations
- integer **ires_nut**
- integer iclb

auto-calibration flag

- integer mrecc

  maximum number of reccnst files
- integer mrecd

  maximum number of recday files
- integer mrecm

  maximum number of recmon files
- integer mtil

  max number of tillage types in till.dat
- integer mudb

  maximum number of urban land types in urban.dat
- integer idist

  rainfall distribution code
  0 for skewed normal dist
  1 for mixed exponential distribution
- integer mrecy

  maximum number of recyear files
- integer nyskip

  number of years to not print output
- integer slrsim

  solar radiation input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin
- integer ideg

  channel degredation code
  1: compute channel degredation (downcutting and widening)
- integer ievent

  rainfall/runoff code
  0 daily rainfall/curve number technique 1 sub-daily rainfall/Green&Ampt/hourly routing 3 sub-daily rainfall/Green&Ampt/hourly routing
- integer ipet

  code for potential ET method
  0 Priestley-Taylor method
  1 Penman/Monteith method
  2 Hargreaves method
  3 read in daily potential ET data
- integer **iopera**
- integer idaf

  beginning day of simulation (julian date)
- integer idal

  ending day of simulation (julian date)
- integer rhsim

  relative humidity input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin
- integer **id1**
- integer **leapyr**
- integer **mo_chk**
- integer nhtot

  number of relative humidity records in file
- integer nstot

  number of solar radiation records in file
- integer nwtot

  number of wind speed records in file

- integer **ifirsts**
- integer **ifirsth**
- integer **ifirstw**
- integer **icst**
- integer ilog

  streamflow print code
- integer itotr

  number of output variables printed (output.rch)
- integer iyr

  beginning year of simulation (year)
- integer iwq

  stream water quality code
  0 do not model stream water quality
  1 model stream water quality (QUAL2E & pesticide transformations)
- integer i

  forecast region number or subbasin number (none)
- integer **iskip**
- integer **ifirstpet**
- integer iprp

  print code for output.pst file
  0 do not print pesticide output
  1 print pesticide output
- integer itotb

  number of output variables printed (output.sub)
- integer itots

  number of output variables printed (output.hru)
- integer itoth

  number of HRUs printed (output.hru/output.wtr)
- integer pcpsim

  rainfall input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin
- integer **nd_30**
- integer **iops**
- integer **iphr**
- integer **isto**
- integer **isol**
- integer fcstcycles

  number of times forecast period is simulated (using different weather generator seeds each time)
- integer fcstday

  beginning date of forecast period (julian date)
- integer fcstyr

  beginning year of forecast period
- integer iscen

  scenarios counter
- integer subtot

  number of subbasins in watershed (none)
- integer **ogen**
- integer mapp

  maximum number of applications
- integer mlyr

  maximum number of soil layers
- integer mpst

max number of pesticides used in wshed

- integer mres

  maximum number of reservoirs

- integer msub

  maximum number of subbasins

- integer igen

  random number generator code:
  0: use default numbers
  1: generate new numbers in every simulation

- integer iprint

  print code: 0=monthly, 1=daily, 2=annual

- integer **iida**
- integer icn

  CN method flag (for testing alternative method):
  0 use traditional SWAT method which bases CN on soil moisture
  1 use alternative method which bases CN on plant ET.

- integer ised_det

  max half-hour rainfall fraction calc option:
  0 generate max half-hour rainfall fraction from triangular distribution
  1 use monthly mean max half-hour rainfall fraction

- integer **fcstcnt**
- integer **mtran**
- integer **idtill**
- integer, dimension(100) **ida_lup**
- integer, dimension(100) **iyr_lup**
- integer **no_lup**
- integer **no_up**
- integer **nostep**
- character(len=8) date

  date simulation is performed where leftmost eight characters are set to a value of yyyymmdd, where yyyy is the year, mm is the month and dd is the day

- character(len=10) time

  time simulation is performed where leftmost ten characters are set to a value of hhmmss.sss, where hh is the hour, mm is the minutes and ss.sss is the seconds and milliseconds

- character(len=5) zone

  time difference with respect to Coordinated Universal Time (ie Greenwich Mean Time)

- character(len=80) prog

  SWAT program header string.

- character(len=13) calfile

  name of file containing calibration parameters

- character(len=13) rhfile

  relative humidity file name (.hmd)

- character(len=13) slrfile

  solar radiation file name (.slr)

- character(len=13) wndfile

  wind speed file name (.wnd)

- character(len=13) petfile

  potential ET file name (.pet)

- character(len=13) **atmofile**
- character(len=13) **lucfile**
- character(len=13) septdb

  name of septic tank database file (septwq1.dat)

- character(len=13) **dpd_file**

- character(len=13) **wpd_file**
- character(len=13) **rib_file**
- character(len=13) **sfb_file**
- character(len=13) **lid_file**
- integer, dimension(9) idg

  array location of random number seed used for a given process
- integer, dimension(:), allocatable **ifirstr**
- integer, dimension(:), allocatable **ifirsthr**
- integer, dimension(8) values

  values(1): year simulation is performed
  values(2): month simulation is performed
  values(3): day in month simulation is performed
  values(4): time difference with respect to Coordinated Universal Time (ie Greenwich Mean Time)
  values(5): hour simulation is performed
  values(6): minute simulation is performed
  values(7): second simulation is performed
  values(8): millisecond simulation is performed
- integer, dimension(13) ndays

  julian date for last day of preceding month (where the array location is the number of the month) The dates are for leap years (julian date)
- integer, dimension(13) **ndays_noleap**
- integer, dimension(13) **ndays_leap**
- integer **mapex**
- real ∗8, dimension(:), allocatable **flodaya**
- real ∗8, dimension(:), allocatable **seddaya**
- real ∗8, dimension(:), allocatable **orgndaya**
- real ∗8, dimension(:), allocatable **orgpdaya**
- real ∗8, dimension(:), allocatable **no3daya**
- real ∗8, dimension(:), allocatable **minpdaya**
- real ∗8, dimension(:), allocatable hi_targ

  index target of cover defined at planting
- real ∗8, dimension(:), allocatable **bio_targ**
- real ∗8, dimension(:), allocatable **tnyld**
- integer, dimension(:), allocatable **idapa**
- integer, dimension(:), allocatable **iypa**
- integer, dimension(:), allocatable **ifirsta**
- integer, dimension(100) **mo_transb**
- integer, dimension(100) **mo_transe**
- integer, dimension(100) **ih_tran**
- integer **msdb**
- integer **iseptic**
- real ∗8, dimension(:), allocatable **sptqs**
- real ∗8, dimension(:), allocatable **percp**
- real ∗8, dimension(:), allocatable **sptbodconcs**
- real ∗8, dimension(:), allocatable **spttssconcs**
- real ∗8, dimension(:), allocatable **spttnconcs**
- real ∗8, dimension(:), allocatable **sptnh4concs**
- real ∗8, dimension(:), allocatable **sptno3concs**
- real ∗8, dimension(:), allocatable **sptno2concs**
- real ∗8, dimension(:), allocatable **sptorgnconcs**
- real ∗8, dimension(:), allocatable **spttpconcs**
- real ∗8, dimension(:), allocatable **sptminps**
- real ∗8, dimension(:), allocatable **sptorgps**
- real ∗8, dimension(:), allocatable **sptfcolis**
- real ∗8, dimension(:), allocatable **failyr**

- real ∗8, dimension(:), allocatable **qstemm**
- real ∗8, dimension(:), allocatable **bio_amn**
- real ∗8, dimension(:), allocatable **bio_bod**
- real ∗8, dimension(:), allocatable **biom**
- real ∗8, dimension(:), allocatable **rbiom**
- real ∗8, dimension(:), allocatable **fcoli**
- real ∗8, dimension(:), allocatable **bio_ntr**
- real ∗8, dimension(:), allocatable **bz_perc**
- real ∗8, dimension(:), allocatable sep_cap

  number of permanent residents in the hourse (none)
- real ∗8, dimension(:), allocatable **plqm**
- real ∗8, dimension(:), allocatable **bz_area**
- real ∗8, dimension(:), allocatable bz_z

  Depth of biozone layer(mm)
- real ∗8, dimension(:), allocatable bz_thk

  thickness of biozone (mm)
- real ∗8, dimension(:), allocatable bio_bd

  density of biomass (kg/m^ 3) carbon outputs for .hru file
- real ∗8, dimension(:), allocatable **cmup_kgh**
- real ∗8, dimension(:), allocatable **cmtot_kgh**
- real ∗8, dimension(:), allocatable coeff_denitr

  denitrification rate coefficient (none)
- real ∗8, dimension(:), allocatable coeff_bod_dc

  BOD decay rate coefficient (m^ 3/day)
- real ∗8, dimension(:), allocatable coeff_bod_conv

  BOD to live bacteria biomass conversion factor (none)
- real ∗8, dimension(:), allocatable coeff_fc1

  field capacity calibration parameter 1 (none)
- real ∗8, dimension(:), allocatable coeff_fc2

  field capacity calibration parameter 2 (none)
- real ∗8, dimension(:), allocatable coeff_fecal

  fecal coliform bacteria decay rate coefficient (m^ 3/day)
- real ∗8, dimension(:), allocatable coeff_mrt

  mortality rate coefficient (none)
- real ∗8, dimension(:), allocatable coeff_nitr

  nitrification rate coefficient (none)
- real ∗8, dimension(:), allocatable coeff_plq

  conversion factor for plaque from TDS (none)
- real ∗8, dimension(:), allocatable coeff_rsp

  respiration rate coefficient (none)
- real ∗8, dimension(:), allocatable coeff_slg1

  slough-off calibration parameter (none)
- real ∗8, dimension(:), allocatable coeff_slg2

  slough-off calibration parameter (none)
- real ∗8, dimension(:), allocatable **coeff_pdistrb**
- real ∗8, dimension(:), allocatable **coeff_solpslp**
- real ∗8, dimension(:), allocatable **coeff_solpintc**
- real ∗8, dimension(:), allocatable **coeff_psorpmax**
- integer, dimension(:), allocatable isep_typ

  septic system type (none)
- integer, dimension(:), allocatable **i_sep**
- integer, dimension(:), allocatable isep_opt

septic system operation flag (1=active, 2=failing, 3=not operated) (none)

- integer, dimension(:), allocatable **sep_tsincefail**
- integer, dimension(:), allocatable **isep_tfail**
- integer, dimension(:), allocatable **isep_iyr**
- integer, dimension(:), allocatable **sep_strm_dist**
- integer, dimension(:), allocatable **sep_den**
- real ∗8, dimension(:), allocatable **sol_sumno3**
- real ∗8, dimension(:), allocatable **sol_sumsolp**
- real ∗8, dimension(:), allocatable **strsw_sum**
- real ∗8, dimension(:), allocatable **strstmp_sum**
- real ∗8, dimension(:), allocatable **strsn_sum**
- real ∗8, dimension(:), allocatable **strsp_sum**
- real ∗8, dimension(:), allocatable **strsa_sum**
- real ∗8, dimension(:), allocatable **spill_hru**
- real ∗8, dimension(:), allocatable **tile_out**
- real ∗8, dimension(:), allocatable **hru_in**
- real ∗8, dimension(:), allocatable **spill_precip**
- real ∗8, dimension(:), allocatable **pot_seep**
- real ∗8, dimension(:), allocatable **pot_evap**
- real ∗8, dimension(:), allocatable **pot_sedin**
- real ∗8, dimension(:), allocatable **pot_solp**
- real ∗8, dimension(:), allocatable **pot_solpi**
- real ∗8, dimension(:), allocatable **pot_orgp**
- real ∗8, dimension(:), allocatable **pot_orgpi**
- real ∗8, dimension(:), allocatable **pot_orgn**
- real ∗8, dimension(:), allocatable **pot_orgni**
- real ∗8, dimension(:), allocatable **pot_mps**
- real ∗8, dimension(:), allocatable **pot_mpsi**
- real ∗8, dimension(:), allocatable **pot_mpa**
- real ∗8, dimension(:), allocatable **pot_mpai**
- real ∗8, dimension(:), allocatable **pot_no3i**
- real ∗8, dimension(:), allocatable **precip_in**
- real ∗8, dimension(:), allocatable **tile_sedo**
- real ∗8, dimension(:), allocatable **tile_no3o**
- real ∗8, dimension(:), allocatable **tile_solpo**
- real ∗8, dimension(:), allocatable **tile_orgno**
- real ∗8, dimension(:), allocatable **tile_orgpo**
- real ∗8, dimension(:), allocatable **tile_minpso**
- real ∗8, dimension(:), allocatable **tile_minpao**
- integer **ia_b**
- integer **ihumus**
- integer **itemp**
- integer **isnow**
- integer, dimension(41) **icolrsv**
- integer, dimension(mhruo) **icols**
- integer, dimension(mrcho) **icolr**
- integer, dimension(msubo) **icolb**
- integer, dimension(46) ipdvar

  output variable codes for output.rch file
- integer, dimension(mhruo) ipdvas

  output varaible codes for output.hru file
- integer, dimension(msubo) ipdvab

  output variable codes for output.sub file
- integer, dimension(:), allocatable ipdhru

HRUs whose output information will be printed to the output.hru and output.wtr files.

- real ∗8, dimension(mstdo) **wshddayo**
- real ∗8, dimension(mstdo) **wshdmono**
- real ∗8, dimension(mstdo) **wshdyro**
- real ∗8, dimension(16) **fcstaao**
- real ∗8, dimension(mstdo) **wshdaao**
- real ∗8, dimension(:,:), allocatable **wpstdayo**
- real ∗8, dimension(:,:), allocatable **wpstmono**
- real ∗8, dimension(:,:), allocatable **wpstyro**
- real ∗8, dimension(:,:), allocatable **yldkg**
- real ∗8, dimension(:,:), allocatable **bio_hv**
- real ∗8, dimension(:,:), allocatable **wpstaao**
- real ∗8, dimension(:,:), allocatable **rchmono**
- real ∗8, dimension(:,:), allocatable **rchyro**
- real ∗8, dimension(:,:), allocatable **rchaao**
- real ∗8, dimension(:,:), allocatable **rchdy**
- real ∗8, dimension(:,:), allocatable **hrumono**
- real ∗8, dimension(:,:), allocatable **hruyro**
- real ∗8, dimension(:,:), allocatable **hruaao**
- real ∗8, dimension(:,:), allocatable **submono**
- real ∗8, dimension(:,:), allocatable **subyro**
- real ∗8, dimension(:,:), allocatable **subaao**
- real ∗8, dimension(:,:), allocatable **resoutm**
- real ∗8, dimension(:,:), allocatable **resouty**
- real ∗8, dimension(:,:), allocatable **resouta**
- real ∗8, dimension(12, 8) **wshd_aamon**
- real ∗8, dimension(:,:), allocatable **wtrmon**
- real ∗8, dimension(:,:), allocatable **wtryr**
- real ∗8, dimension(:,:), allocatable **wtraa**
- real ∗8, dimension(:,:), allocatable sub_smfmx

  max melt rate for snow during year (June 21) for subbasin(:) where deg C refers to the air temperature. SUB_SMFMX and SMFMN allow the rate of snow melt to vary through the year. These parameters are accounting for the impact of soil temperature on snow melt (range: -5.0/5.0) (mm/deg C/day)
- real ∗8, dimension(:,:), allocatable sub_smfmn

  min melt rate for snow during year (Dec 21) for subbasin(:) (range: -5.0/5.0) where deg C refers to the air temperature (mm/deg C/day)
- real ∗8, dimension(:,:,:), allocatable **hrupstd**
- real ∗8, dimension(:,:,:), allocatable **hrupsta**
- real ∗8, dimension(:,:,:), allocatable **hrupstm**
- real ∗8, dimension(:,:,:), allocatable **hrupsty**
- integer, dimension(:), allocatable **ifirstt**
- integer, dimension(:), allocatable **ifirstpcp**
- integer, dimension(:), allocatable **elevp**
- integer, dimension(:), allocatable **elevt**
- real ∗8, dimension(:,:), allocatable ftmpmn

  avg monthly minimum air temperature (deg C)
- real ∗8, dimension(:,:), allocatable ftmpmx

  avg monthly maximum air temperature (deg C)
- real ∗8, dimension(:,:), allocatable ftmpstdmn

  standard deviation for avg monthly minimum air temperature (deg C)
- real ∗8, dimension(:,:), allocatable ftmpstdmx

  standard deviation for avg monthly maximum air temperature (deg C)
- real ∗8, dimension(:,:,:), allocatable fpcp_stat

fpcp_stat(:,1,:): average amount of precipitation falling in one day for the month (mm/day)
fpcp_stat(:,2,:): standard deviation for the average daily precipitation (mm/day)
fpcp_stat(:,3,:): skew coefficient for the average daily precipitationa (none)

- real ∗8, dimension(:,:), allocatable fpr_w1

  probability of wet day after dry day in month (none)
- real ∗8, dimension(:,:), allocatable fpr_w2

  probability of wet day after wet day in month (none)
- real ∗8, dimension(:,:), allocatable fpr_w3

  proportion of wet days in the month (none)
- real ∗8, dimension(:), allocatable **flwin**
- real ∗8, dimension(:), allocatable **flwout**
- real ∗8, dimension(:), allocatable **bankst**
- real ∗8, dimension(:), allocatable **ch_wi**
- real ∗8, dimension(:), allocatable **ch_d**
- real ∗8, dimension(:), allocatable ch_onco

  channel organic n concentration (ppm)
- real ∗8, dimension(:), allocatable ch_opco

  channel organic p concentration (ppm)
- real ∗8, dimension(:), allocatable **ch_orgn**
- real ∗8, dimension(:), allocatable **ch_orgp**
- real ∗8, dimension(:), allocatable **drift**
- real ∗8, dimension(:), allocatable **rch_dox**
- real ∗8, dimension(:), allocatable **rch_bactp**
- real ∗8, dimension(:), allocatable **alpha_bnk**
- real ∗8, dimension(:), allocatable **alpha_bnke**
- real ∗8, dimension(:), allocatable **disolvp**
- real ∗8, dimension(:), allocatable **algae**
- real ∗8, dimension(:), allocatable **sedst**
- real ∗8, dimension(:), allocatable **rchstor**
- real ∗8, dimension(:), allocatable **organicn**
- real ∗8, dimension(:), allocatable **organicp**
- real ∗8, dimension(:), allocatable **chlora**
- real ∗8, dimension(:), allocatable **nitraten**
- real ∗8, dimension(:), allocatable **nitriten**
- real ∗8, dimension(:), allocatable **ch_li**
- real ∗8, dimension(:), allocatable **ch_si**
- real ∗8, dimension(:), allocatable **ch_bnk_san**
- real ∗8, dimension(:), allocatable **ch_bnk_sil**
- real ∗8, dimension(:), allocatable **ch_bnk_cla**
- real ∗8, dimension(:), allocatable **ch_bnk_gra**
- real ∗8, dimension(:), allocatable **ch_bed_san**
- real ∗8, dimension(:), allocatable **ch_bed_sil**
- real ∗8, dimension(:), allocatable **ch_bed_cla**
- real ∗8, dimension(:), allocatable **ch_bed_gra**
- real ∗8, dimension(:), allocatable **depfp**
- real ∗8, dimension(:), allocatable **depsanfp**
- real ∗8, dimension(:), allocatable **depsilfp**
- real ∗8, dimension(:), allocatable **depclafp**
- real ∗8, dimension(:), allocatable **depsagfp**
- real ∗8, dimension(:), allocatable **deplagfp**
- real ∗8, dimension(:), allocatable **depch**
- real ∗8, dimension(:), allocatable **depsanch**
- real ∗8, dimension(:), allocatable **depsilch**
- real ∗8, dimension(:), allocatable **depclach**

- real ∗8, dimension(:), allocatable **depsagch**
- real ∗8, dimension(:), allocatable **deplagch**
- real ∗8, dimension(:), allocatable **depgrach**
- real ∗8, dimension(:), allocatable **depgrafp**
- real ∗8, dimension(:), allocatable **grast**
- real ∗8, dimension(:), allocatable **depprch**
- real ∗8, dimension(:), allocatable **depprfp**
- real ∗8, dimension(:), allocatable **prf**
- real ∗8, dimension(:), allocatable **r2adj**
- real ∗8, dimension(:), allocatable spcon

  linear parameter for calculating sediment reentrained in channel sediment routing
- real ∗8, dimension(:), allocatable spexp

  exponent parameter for calculating sediment reentrained in channel sediment routing
- real ∗8, dimension(:), allocatable **sanst**
- real ∗8, dimension(:), allocatable **silst**
- real ∗8, dimension(:), allocatable **clast**
- real ∗8, dimension(:), allocatable **sagst**
- real ∗8, dimension(:), allocatable **lagst**
- real ∗8, dimension(:), allocatable **pot_san**
- real ∗8, dimension(:), allocatable **pot_sil**
- real ∗8, dimension(:), allocatable **pot_cla**
- real ∗8, dimension(:), allocatable **pot_sag**
- real ∗8, dimension(:), allocatable **pot_lag**
- real ∗8, dimension(:), allocatable **potsani**
- real ∗8, dimension(:), allocatable **potsili**
- real ∗8, dimension(:), allocatable **potclai**
- real ∗8, dimension(:), allocatable **potsagi**
- real ∗8, dimension(:), allocatable **potlagi**
- real ∗8, dimension(:), allocatable **sanyld**
- real ∗8, dimension(:), allocatable **silyld**
- real ∗8, dimension(:), allocatable **clayld**
- real ∗8, dimension(:), allocatable **sagyld**
- real ∗8, dimension(:), allocatable **lagyld**
- real ∗8, dimension(:), allocatable **grayld**
- real ∗8, dimension(:), allocatable **res_san**
- real ∗8, dimension(:), allocatable **res_sil**
- real ∗8, dimension(:), allocatable **res_cla**
- real ∗8, dimension(:), allocatable **res_sag**
- real ∗8, dimension(:), allocatable **res_lag**
- real ∗8, dimension(:), allocatable **res_gra**
- real ∗8, dimension(:), allocatable **pnd_san**
- real ∗8, dimension(:), allocatable **pnd_sil**
- real ∗8, dimension(:), allocatable **pnd_cla**
- real ∗8, dimension(:), allocatable **pnd_sag**
- real ∗8, dimension(:), allocatable **pnd_lag**
- real ∗8, dimension(:), allocatable **wet_san**
- real ∗8, dimension(:), allocatable **wet_sil**
- real ∗8, dimension(:), allocatable **wet_cla**
- real ∗8, dimension(:), allocatable **wet_lag**
- real ∗8, dimension(:), allocatable **wet_sag**
- real ∗8 **ressano**
- real ∗8 **ressilo**
- real ∗8 **resclao**
- real ∗8 **ressago**

- real ∗8 **reslago**
- real ∗8 **resgrao**
- real ∗8 **ressani**
- real ∗8 **ressili**
- real ∗8 **resclai**
- real ∗8 **ressagi**
- real ∗8 **reslagi**
- real ∗8 **resgrai**
- real ∗8 **potsano**
- real ∗8 **potsilo**
- real ∗8 **potclao**
- real ∗8 **potsago**
- real ∗8 **potlago**
- real ∗8 **pndsanin**
- real ∗8 **pndsilin**
- real ∗8 **pndclain**
- real ∗8 **pndsagin**
- real ∗8 **pndlagin**
- real ∗8 **pndsano**
- real ∗8 **pndsilo**
- real ∗8 **pndclao**
- real ∗8 **pndsago**
- real ∗8 **pndlago**
- real ∗8, dimension(:), allocatable **ch_di**
- real ∗8, dimension(:), allocatable **ch_erod**
- real ∗8, dimension(:), allocatable **ch_l2**
- real ∗8, dimension(:), allocatable **ch_cov**
- real ∗8, dimension(:), allocatable **ch_cov1**
- real ∗8, dimension(:), allocatable **ch_cov2**
- real ∗8, dimension(:), allocatable **ch_bnk_bd**
- real ∗8, dimension(:), allocatable **ch_bed_bd**
- real ∗8, dimension(:), allocatable **ch_bnk_kd**
- real ∗8, dimension(:), allocatable **ch_bed_kd**
- real ∗8, dimension(:), allocatable **ch_bnk_d50**
- real ∗8, dimension(:), allocatable **ch_bed_d50**
- real ∗8, dimension(:), allocatable **tc_bed**
- real ∗8, dimension(:), allocatable **tc_bnk**
- integer, dimension(:), allocatable **ch_eqn**
- real ∗8, dimension(:), allocatable **chpst_conc**
- real ∗8, dimension(:), allocatable **chpst_rea**
- real ∗8, dimension(:), allocatable **chpst_vol**
- real ∗8, dimension(:), allocatable **chpst_koc**
- real ∗8, dimension(:), allocatable **chpst_stl**
- real ∗8, dimension(:), allocatable **chpst_rsp**
- real ∗8, dimension(:), allocatable **chpst_mix**
- real ∗8, dimension(:), allocatable **sedpst_conc**
- real ∗8, dimension(:), allocatable **ch_wdr**
- real ∗8, dimension(:), allocatable **sedpst_rea**
- real ∗8, dimension(:), allocatable **sedpst_bry**
- real ∗8, dimension(:), allocatable **sedpst_act**
- real ∗8, dimension(:), allocatable **rch_cbod**
- real ∗8, dimension(:), allocatable **rch_bactlp**
- real ∗8, dimension(:), allocatable **chside**
- real ∗8, dimension(:), allocatable **rs1**
- real ∗8, dimension(:), allocatable **rs2**

- real ∗8, dimension(:), allocatable **rs3**
- real ∗8, dimension(:), allocatable **rs4**
- real ∗8, dimension(:), allocatable **rs5**
- real ∗8, dimension(:), allocatable **rs6**
- real ∗8, dimension(:), allocatable **rs7**
- real ∗8, dimension(:), allocatable **rk1**
- real ∗8, dimension(:), allocatable **rk2**
- real ∗8, dimension(:), allocatable **rk3**
- real ∗8, dimension(:), allocatable **rk4**
- real ∗8, dimension(:), allocatable **rk5**
- real ∗8, dimension(:), allocatable bc1

  rate constant for biological oxidation of NH3 to NO2 in reach at 20 deg C (1/hr)

- real ∗8, dimension(:), allocatable bc2

  rate constant for biological oxidation of NO2 to NO3 in reach at 20 deg C (1/hr)
- real ∗8, dimension(:), allocatable bc3

  rate constant for hydrolysis of organic N to ammonia in reach at 20 deg C (1/hr)

- real ∗8, dimension(:), allocatable bc4

  rate constant for the decay of organic P to dissolved P in reach at 20 deg C (1/hr)

- real ∗8, dimension(:), allocatable **rk6**
- real ∗8, dimension(:), allocatable **ammonian**
- real ∗8, dimension(:), allocatable **orig_sedpstconc**
- real ∗8, dimension(:,:), allocatable **wurch**
- integer, dimension(:), allocatable **icanal**
- integer, dimension(:), allocatable **itb**
- real ∗8, dimension(:), allocatable **ch_revap**
- real ∗8, dimension(:), allocatable **dep_chan**
- real ∗8, dimension(:), allocatable harg_petco

  coefficient related to radiation used in hargreaves eq (range: 0.0019 - 0.0032)
- real ∗8, dimension(:), allocatable **subfr_nowtr**
- real ∗8, dimension(:), allocatable cncoef_sub

  soil water depletion coefficient used in the new (modified curve number method) same as soil index coeff used in APEX range: 0.5 - 2.0
- real ∗8, dimension(:), allocatable **dr_sub**
- real ∗8, dimension(:), allocatable **wcklsp**
- real ∗8, dimension(:), allocatable **sub_fr**
- real ∗8, dimension(:), allocatable **sub_minp**
- real ∗8, dimension(:), allocatable **sub_sw**
- real ∗8, dimension(:), allocatable **sub_sumfc**
- real ∗8, dimension(:), allocatable **sub_gwno3**
- real ∗8, dimension(:), allocatable **sub_gwsolp**
- real ∗8, dimension(:), allocatable co2

  CO2 concentration (ppmv)
- real ∗8, dimension(:), allocatable sub_km

  area of subbasin in square kilometers (km^2)
- real ∗8, dimension(:), allocatable **sub_tc**
- real ∗8, dimension(:), allocatable **wlat**
- real ∗8, dimension(:), allocatable **sub_pet**
- real ∗8, dimension(:), allocatable **welev**
- real ∗8, dimension(:), allocatable **sub_orgn**
- real ∗8, dimension(:), allocatable **sub_orgp**
- real ∗8, dimension(:), allocatable **sub_bd**

- real ∗8, dimension(:), allocatable **sub_wtmp**
- real ∗8, dimension(:), allocatable **sub_sedpa**
- real ∗8, dimension(:), allocatable **sub_sedps**
- real ∗8, dimension(:), allocatable **sub_minpa**
- real ∗8, dimension(:), allocatable **sub_minps**
- real ∗8, dimension(:), allocatable **daylmn**
- real ∗8, dimension(:), allocatable **latcos**
- real ∗8, dimension(:), allocatable **latsin**
- real ∗8, dimension(:), allocatable **phutot**
- real ∗8, dimension(:), allocatable plaps

  precipitation lapse rate: precipitation change due to change in elevation (mm H2O/km)
- real ∗8, dimension(:), allocatable tlaps

  temperature lapse rate: temperature change due to change in elevation (deg C/km)
- real ∗8, dimension(:), allocatable **tmp_an**
- real ∗8, dimension(:), allocatable **sub_precip**
- real ∗8, dimension(:), allocatable **pcpdays**
- real ∗8, dimension(:), allocatable **rcn_sub**
- real ∗8, dimension(:), allocatable **rammo_sub**
- real ∗8, dimension(:), allocatable **atmo_day**
- real ∗8, dimension(:), allocatable **sub_snom**
- real ∗8, dimension(:), allocatable **sub_qd**
- real ∗8, dimension(:), allocatable **sub_sedy**
- real ∗8, dimension(:), allocatable **sub_tran**
- real ∗8, dimension(:), allocatable **sub_no3**
- real ∗8, dimension(:), allocatable **sub_latno3**
- real ∗8, dimension(:,:), allocatable sub_sftmp

  snowfall temperature for subbasin(:). Mean air temperature at which precip is equally likely to be rain as snow/freezing rain (range: -5.0/5.0) (deg C)
- real ∗8, dimension(:,:), allocatable sub_smtmp

  snow melt base temperature for subbasin(:) mean air temperature at which snow melt will occur (range: -5.0/5.0) (deg C)
- real ∗8, dimension(:,:), allocatable **sub_timp**
- real ∗8, dimension(:), allocatable **sub_tileno3**
- real ∗8, dimension(:), allocatable **sub_solp**
- real ∗8, dimension(:), allocatable **sub_subp**
- real ∗8, dimension(:), allocatable **sub_etday**
- real ∗8, dimension(:), allocatable sub_elev

  average elevation of subbasin (m)
- real ∗8, dimension(:), allocatable **sub_wyld**
- real ∗8, dimension(:), allocatable **sub_surfq**
- real ∗8, dimension(:), allocatable **qird**
- real ∗8, dimension(:), allocatable **sub_gwq**
- real ∗8, dimension(:), allocatable **sub_sep**
- real ∗8, dimension(:), allocatable **sub_chl**
- real ∗8, dimension(:), allocatable **sub_cbod**
- real ∗8, dimension(:), allocatable **sub_dox**
- real ∗8, dimension(:), allocatable **sub_solpst**
- real ∗8, dimension(:), allocatable **sub_sorpst**
- real ∗8, dimension(:), allocatable **sub_yorgn**
- real ∗8, dimension(:), allocatable **sub_yorgp**
- real ∗8, dimension(:), allocatable sub_lat

  latitude of subbasin (degrees)
- real ∗8, dimension(:), allocatable **sub_bactp**
- real ∗8, dimension(:), allocatable **sub_bactlp**

- real ∗8, dimension(:), allocatable **sub_latq**
- real ∗8, dimension(:), allocatable **sub_gwq_d**
- real ∗8, dimension(:), allocatable **sub_tileq**
- real ∗8, dimension(:), allocatable **sub_vaptile**
- real ∗8, dimension(:), allocatable **sub_dsan**
- real ∗8, dimension(:), allocatable **sub_dsil**
- real ∗8, dimension(:), allocatable **sub_dcla**
- real ∗8, dimension(:), allocatable **sub_dsag**
- real ∗8, dimension(:), allocatable **sub_dlag**
- real ∗8 **vap_tile**
- real ∗8, dimension(:), allocatable **wnan**
- real ∗8, dimension(:,:), allocatable **sol_stpwt**
- real ∗8, dimension(:,:), allocatable **sub_pst**
- real ∗8, dimension(:,:), allocatable **sub_hhqd**
- real ∗8, dimension(:,:), allocatable **sub_hhwtmp**
- real ∗8, dimension(:,:), allocatable huminc

  monthly humidity adjustment. Daily values for relative humidity within the month are rasied or lowered by the specified amount (used in climate change studies) (none)
- real ∗8, dimension(:,:), allocatable radinc

  monthly solar radiation adjustment. Daily radiation within the month is raised or lowered by the specified amount. (used in climate change studies) (MJ/m^2)
- real ∗8, dimension(:,:), allocatable rfinc

  monthly rainfall adjustment. Daily rainfall within the month is adjusted to the specified percentage of the original value (used in climate change studies)(%)
- real ∗8, dimension(:,:), allocatable tmpinc

  monthly temperature adjustment. Daily maximum and minimum temperatures within the month are raised or lowered by the specified amount (used in climate change studies) (deg C)
- real ∗8, dimension(:), allocatable ch_k1

  effective hydraulic conductivity of tributary channel alluvium (mm/hr)
- real ∗8, dimension(:), allocatable **ch_k2**
- real ∗8, dimension(:,:), allocatable elevb

  elevation at the center of the band (m)
- real ∗8, dimension(:,:), allocatable elevb_fr

  fraction of subbasin area within elevation band (the same fractions should be listed for all HRUs within the subbasin) (none)
- real ∗8, dimension(:,:), allocatable **wndav**
- real ∗8, dimension(:), allocatable ch_n1

  Manning's "n" value for the tributary channels (none)
- real ∗8, dimension(:), allocatable **ch_n2**
- real ∗8, dimension(:), allocatable ch_s1

  average slope of tributary channels (m/m)
- real ∗8, dimension(:), allocatable **ch_s2**
- real ∗8, dimension(:), allocatable ch_w1

  average width of tributary channels (m)
- real ∗8, dimension(:), allocatable **ch_w2**
- real ∗8, dimension(:,:), allocatable **dewpt**
- real ∗8, dimension(:,:), allocatable **amp_r**
- real ∗8, dimension(:,:), allocatable **solarav**
- real ∗8, dimension(:,:), allocatable **tmpstdmx**
- real ∗8, dimension(:,:), allocatable **tmpstdmn**
- real ∗8, dimension(:,:), allocatable **pcf**
- real ∗8, dimension(:,:), allocatable **tmpmn**
- real ∗8, dimension(:,:), allocatable **tmpmx**
- real ∗8, dimension(:,:), allocatable **otmpstdmn**

- real ∗8, dimension(:,:), allocatable **otmpmn**
- real ∗8, dimension(:,:), allocatable **otmpmx**
- real ∗8, dimension(:,:), allocatable **otmpstdmx**
- real ∗8, dimension(:,:), allocatable **ch_erodmo**
- real ∗8, dimension(:,:), allocatable **uh**
- real ∗8, dimension(:,:), allocatable **hqdsave**
- real ∗8, dimension(:,:), allocatable **hsdsave**
- real ∗8, dimension(:,:), allocatable **pr_w1**
- real ∗8, dimension(:,:), allocatable **pr_w2**
- real ∗8, dimension(:,:), allocatable **pr_w3**
- real ∗8, dimension(:,:,:), allocatable **pcp_stat**
- real ∗8, dimension(:,:), allocatable **opr_w1**
- real ∗8, dimension(:,:), allocatable **opr_w2**
- real ∗8, dimension(:,:), allocatable **opr_w3**
- real ∗8, dimension(:,:,:), allocatable **opcp_stat**
- integer, dimension(:), allocatable **hrutot**
- integer, dimension(:), allocatable **hru1**
- integer, dimension(:), allocatable **ireg**
- integer, dimension(:), allocatable ihgage

  subbasin relative humidity data code (none)
- integer, dimension(:), allocatable isgage

  subbasin radiation gage data code (none)
- integer, dimension(:), allocatable iwgage

  subbasin wind speed gage data code (none)
- integer, dimension(:), allocatable subgis

  GIS code printed to output files (output.sub) (none.
- integer, dimension(:), allocatable irgage

  subbasin rain gage data code (none)
- integer, dimension(:), allocatable itgage

  subbasin temp gage data code (none)
- integer, dimension(:), allocatable **fcst_reg**
- integer, dimension(:), allocatable **irelh**
- real ∗8, dimension(:,:), allocatable **sol_aorgn**
- real ∗8, dimension(:,:), allocatable **sol_tmp**
- real ∗8, dimension(:,:), allocatable **sol_fon**
- real ∗8, dimension(:,:), allocatable **sol_awc**
- real ∗8, dimension(:,:), allocatable **sol_prk**
- real ∗8, dimension(:,:), allocatable **volcr**
- real ∗8, dimension(:,:), allocatable pperco_sub

  subbasin phosphorus percolation coefficient. Ratio of soluble phosphorus in surface to soluble phosphorus in percolate
- real ∗8, dimension(:,:), allocatable **sol_actp**
- real ∗8, dimension(:,:), allocatable **sol_stap**
- real ∗8, dimension(:,:), allocatable **conv_wt**
- real ∗8, dimension(:,:), allocatable **sol_solp**
- real ∗8, dimension(:,:), allocatable **sol_ul**
- real ∗8, dimension(:,:), allocatable **sol_fc**
- real ∗8, dimension(:,:), allocatable **crdep**
- real ∗8, dimension(:,:), allocatable **sol_z**
- real ∗8, dimension(:,:), allocatable **sol_up**
- real ∗8, dimension(:,:), allocatable **sol_bd**
- real ∗8, dimension(:,:), allocatable **sol_st**
- real ∗8, dimension(:,:), allocatable **flat**
- real ∗8, dimension(:,:), allocatable **sol_nh3**

- real ∗8, dimension(:,:), allocatable **sol_hk**
- real ∗8, dimension(:,:), allocatable **sol_clay**
- real ∗8, dimension(:,:), allocatable **sol_ec**
- real ∗8, dimension(:,:), allocatable **sol_orgn**
- real ∗8, dimension(:,:), allocatable **sol_por**
- real ∗8, dimension(:,:), allocatable **sol_wp**
- real ∗8, dimension(:,:), allocatable **sol_orgp**
- real ∗8, dimension(:,:), allocatable **sol_hum**
- real ∗8, dimension(:,:), allocatable **sol_wpmm**
- real ∗8, dimension(:,:), allocatable **sol_k**
- real ∗8, dimension(:,:), allocatable **sol_cbn**
- real ∗8, dimension(:,:), allocatable **sol_no3**
- real ∗8, dimension(:,:), allocatable **sol_rsd**
- real ∗8, dimension(:,:), allocatable **sol_fop**
- real ∗8, dimension(:,:), allocatable **sol_silt**
- real ∗8, dimension(:,:), allocatable **sol_sand**
- real ∗8, dimension(:,:), allocatable **sol_rock**
- real ∗8, dimension(:,:), allocatable **orig_solno3**
- real ∗8, dimension(:,:), allocatable **orig_solorgn**
- real ∗8, dimension(:,:), allocatable **orig_solsolp**
- real ∗8, dimension(:,:), allocatable **orig_solorgp**
- real ∗8, dimension(:,:), allocatable **orig_soltmp**
- real ∗8, dimension(:,:), allocatable **orig_solrsd**
- real ∗8, dimension(:,:), allocatable **orig_solfop**
- real ∗8, dimension(:,:), allocatable **orig_solfon**
- real ∗8, dimension(:,:), allocatable **orig_solaorgn**
- real ∗8, dimension(:,:), allocatable **orig_solst**
- real ∗8, dimension(:,:), allocatable **orig_solactp**
- real ∗8, dimension(:,:), allocatable **orig_solstap**
- real ∗8, dimension(:,:), allocatable **orig_volcr**
- real ∗8, dimension(:,:), allocatable **conk**
- real ∗8, dimension(:,:,:), allocatable **sol_pst**
- real ∗8, dimension(:,:,:), allocatable **sol_kp**
- real ∗8, dimension(:,:,:), allocatable **orig_solpst**
- real ∗8, dimension(:), allocatable **velsetlr**
- real ∗8, dimension(:), allocatable **velsetlp**
- real ∗8, dimension(:), allocatable **br1**
- real ∗8, dimension(:), allocatable **res_k**
- real ∗8, dimension(:), allocatable **lkpst_conc**
- real ∗8, dimension(:), allocatable **evrsv**
- real ∗8, dimension(:), allocatable **res_evol**
- real ∗8, dimension(:), allocatable **res_pvol**
- real ∗8, dimension(:), allocatable **res_vol**
- real ∗8, dimension(:), allocatable **res_psa**
- real ∗8, dimension(:), allocatable **lkpst_rea**
- real ∗8, dimension(:), allocatable **lkpst_vol**
- real ∗8, dimension(:), allocatable **br2**
- real ∗8, dimension(:), allocatable **res_rr**
- real ∗8, dimension(:), allocatable **res_sed**
- real ∗8, dimension(:), allocatable **lkpst_koc**
- real ∗8, dimension(:), allocatable **lkpst_stl**
- real ∗8, dimension(:), allocatable **lkpst_rsp**
- real ∗8, dimension(:), allocatable **lkpst_mix**
- real ∗8, dimension(:), allocatable **lkspst_conc**
- real ∗8, dimension(:), allocatable **lkspst_rea**

- real ∗8, dimension(:), allocatable **theta_n**
- real ∗8, dimension(:), allocatable **theta_p**
- real ∗8, dimension(:), allocatable **con_nirr**
- real ∗8, dimension(:), allocatable **con_pirr**
- real ∗8, dimension(:), allocatable **lkspst_bry**
- real ∗8, dimension(:), allocatable **lkspst_act**
- real ∗8, dimension(:), allocatable **sed_stlr**
- real ∗8, dimension(7) **resdata**
- real ∗8, dimension(:), allocatable **wurtnf**
- real ∗8, dimension(:), allocatable **res_nsed**
- real ∗8, dimension(:), allocatable **chlar**
- real ∗8, dimension(:), allocatable **res_orgn**
- real ∗8, dimension(:), allocatable **res_orgp**
- real ∗8, dimension(:), allocatable **res_no3**
- real ∗8, dimension(:), allocatable **res_solp**
- real ∗8, dimension(:), allocatable **res_chla**
- real ∗8, dimension(:), allocatable **res_seci**
- real ∗8, dimension(:), allocatable **res_esa**
- real ∗8, dimension(:), allocatable **seccir**
- real ∗8, dimension(:), allocatable **res_no2**
- real ∗8, dimension(:), allocatable **res_nh3**
- real ∗8, dimension(:), allocatable **res_bactp**
- real ∗8, dimension(:), allocatable **res_bactlp**
- real ∗8, dimension(:), allocatable **oflowmn_fps**
- real ∗8, dimension(:), allocatable **starg_fps**
- real ∗8, dimension(:), allocatable **weirc**
- real ∗8, dimension(:), allocatable **weirk**
- real ∗8, dimension(:), allocatable **weirw**
- real ∗8, dimension(:), allocatable **acoef**
- real ∗8, dimension(:), allocatable **bcoef**
- real ∗8, dimension(:), allocatable **ccoef**
- real ∗8, dimension(:), allocatable **orig_resvol**
- real ∗8, dimension(:), allocatable **orig_ressed**
- real ∗8, dimension(:), allocatable **orig_lkpstconc**
- real ∗8, dimension(:), allocatable **orig_lkspstconc**
- real ∗8, dimension(:), allocatable **orig_ressolp**
- real ∗8, dimension(:), allocatable **orig_resorgp**
- real ∗8, dimension(:), allocatable **orig_resno3**
- real ∗8, dimension(:), allocatable **orig_resno2**
- real ∗8, dimension(:), allocatable **orig_resnh3**
- real ∗8, dimension(:), allocatable **orig_resorgn**
- real ∗8, dimension(:,:), allocatable **starg**
- real ∗8, dimension(:,:), allocatable **oflowmx**
- real ∗8, dimension(:,:), allocatable **oflowmn**
- real ∗8, dimension(:,:), allocatable **psetlr**
- real ∗8, dimension(:,:), allocatable **nsetlr**
- real ∗8, dimension(:,:), allocatable **wuresn**
- real ∗8, dimension(:,:,:), allocatable **res_out**
- integer, dimension(:), allocatable **ires1**
- integer, dimension(:), allocatable **ires2**
- integer, dimension(:), allocatable **res_sub**
- integer, dimension(:), allocatable **iresco**
- integer, dimension(:), allocatable **mores**
- integer, dimension(:), allocatable **iyres**
- integer, dimension(:), allocatable **iflod1r**

- integer, dimension(:), allocatable **iflod2r**
- integer, dimension(:), allocatable **ndtargr**
- real ∗8, dimension(:), allocatable ap_ef

  application efficiency (0-1) (none)
- real ∗8, dimension(:), allocatable decay_f

  exponential of the rate constant for degradation of the pesticide on foliage (none)
- real ∗8, dimension(:), allocatable skoc

  soil adsorption coefficient normalized for soil organic carbon content ((mg/kg)/(mg/L))
- real ∗8, dimension(:), allocatable decay_s

  exponential of the rate constant for degradation of the pesticide in soil (none)
- real ∗8, dimension(:), allocatable hlife_f

  half-life of pesticide on foliage (days)
- real ∗8, dimension(:), allocatable hlife_s

  half-life of pesticide in soil (days)
- real ∗8, dimension(:), allocatable pst_wof

  fraction of pesticide on foliage which is washed-off by a rainfall event (none)
- real ∗8, dimension(:), allocatable pst_wsol

  solubility of chemical in water (mg/L (ppm))
- real ∗8, dimension(:), allocatable **irramt**
- real ∗8, dimension(:), allocatable **phusw**
- real ∗8, dimension(:), allocatable **phusw_nocrop**
- integer, dimension(:), allocatable pstflg

  flag for types of pesticide used in watershed array location is pesticide ID number
  0: pesticide not used
  1: pesticide used
- integer, dimension(:), allocatable **nope**
- integer, dimension(:), allocatable **nop**
- integer, dimension(:), allocatable **yr_skip**
- integer, dimension(:), allocatable **isweep**
- integer, dimension(:), allocatable **icrmx**
- integer, dimension(:), allocatable **nopmx**
- integer, dimension(:,:), allocatable **mgtop**
- integer, dimension(:,:), allocatable **idop**
- integer, dimension(:,:), allocatable **mgt1iop**
- integer, dimension(:,:), allocatable **mgt2iop**
- integer, dimension(:,:), allocatable **mgt3iop**
- real ∗8, dimension(:,:), allocatable **mgt4op**
- real ∗8, dimension(:,:), allocatable **mgt5op**
- real ∗8, dimension(:,:), allocatable **mgt6op**
- real ∗8, dimension(:,:), allocatable **mgt7op**
- real ∗8, dimension(:,:), allocatable **mgt8op**
- real ∗8, dimension(:,:), allocatable **mgt9op**
- real ∗8, dimension(:,:), allocatable **mgt10iop**
- real ∗8, dimension(:,:), allocatable **phu_op**
- real ∗8, dimension(:), allocatable cnyld

  fraction of nitrogen in yield (kg N/kg yield)
- real ∗8, dimension(:), allocatable rsdco_pl

  plant residue decomposition coefficient. The fraction of residue which will decompose in a day assuming optimal moisture, temperature, C:N ratio, and C:P ratio (none)
- real ∗8, dimension(:), allocatable wac21

  1st shape parameter for radiation use efficiency equation (none)
- real ∗8, dimension(:), allocatable wac22

  2nd shape parameter for radiation use efficiency equation (none)

- real ∗8, dimension(:), allocatable alai_min

  minimum LAI during winter dormant period (m^2/m^2)
- real ∗8, dimension(:), allocatable leaf1

  1st shape parameter for leaf area development equation (none)
- real ∗8, dimension(:), allocatable leaf2

  2nd shape parameter for leaf area development equation (none)
- real ∗8, dimension(:), allocatable wsyf

  Value of harvest index between 0 and HVSTI which represents the lowest value expected due to water stress ((kg/ha)/(kg/ha))
- real ∗8, dimension(:), allocatable bio_e

  biomass-energy ratio. The potential (unstressed) growth rate per unit of intercepted photosynthetically active radiation.((kg/ha)/(MJ/m∗∗2))
- real ∗8, dimension(:), allocatable hvsti

  harvest index: crop yield/aboveground biomass ((kg/ha)/(kg/ha))
- real ∗8, dimension(:), allocatable t_base

  minimum temperature for plant growth (deg C)
- real ∗8, dimension(:), allocatable t_opt

  optimal temperature for plant growth (deg C)
- real ∗8, dimension(:), allocatable chtmx

  maximum canopy height (m)
- real ∗8, dimension(:), allocatable cvm

  natural log of USLE_C (none)
- real ∗8, dimension(:), allocatable gsi

  maximum stomatal conductance (m/s)
- real ∗8, dimension(:), allocatable vpd2

  rate of decline in stomatal conductance per unit increase in vapor pressure deficit ((m/s)∗(1/kPa))
- real ∗8, dimension(:), allocatable wavp

  rate of decline in radiation use efficiency as a function of vapor pressure deficit (none)
- real ∗8, dimension(:), allocatable bio_leaf

  fraction of leaf/needle biomass that drops during dormancy (for trees only) (none)
- real ∗8, dimension(:), allocatable blai

  maximum (potential) leaf area index (none)
- real ∗8, dimension(:), allocatable cpyld

  fraction of phosphorus in yield (kg P/kg yield)
- real ∗8, dimension(:), allocatable dlai

  fraction of growing season when leaf area declines (none)
- real ∗8, dimension(:), allocatable rdmx

  maximum root depth (m)
- real ∗8, dimension(:), allocatable bio_n1

  1st shape parameter for plant N uptake equation (none)
- real ∗8, dimension(:), allocatable bio_n2

  2nd shape parameter for plant N uptake equation (none)
- real ∗8, dimension(:), allocatable bio_p1

  1st shape parameter for plant P uptake equation (none)
- real ∗8, dimension(:), allocatable bio_p2

  2st shape parameter for plant P uptake equation (none)
- real ∗8, dimension(:), allocatable bm_dieoff

  fraction above ground biomass that dies off at dormancy (fraction)
- real ∗8, dimension(:), allocatable **bmx_trees**
- real ∗8, dimension(:), allocatable **ext_coef**
- real ∗8, dimension(:), allocatable rsr1

initial root to shoot ratio at the beg of growing season

- real ∗8, dimension(:), allocatable rsr2

  root to shoot ratio at the end of the growing season

- real ∗8, dimension(:,:), allocatable pltnfr

  pltnfr(1,:) nitrogen uptake parameter #1: normal fraction of N in crop biomass at emergence (kg N/kg biomass)
  pltnfr(2,:) nitrogen uptake parameter #2: normal fraction of N in crop biomass at 0.5 maturity (kg N/kg biomass)
  pltnfr(3,:) nitrogen uptake parameter #3: normal fraction of N in crop biomass at maturity (kg N/kg biomass)

- real ∗8, dimension(:,:), allocatable pltpfr

  pltpfr(1,:) phosphorus uptake parameter #1: normal fraction of P in crop biomass at emergence (kg P/kg biomass)
  pltpfr(2,:) phosphorus uptake parameter #2: normal fraction of P in crop biomass at 0.5 maturity (kg P/kg biomass)
  pltpfr(3,:) phosphorus uptake parameter #3: normal fraction of P in crop biomass at maturity (kg P/kg biomass)

- integer, dimension(:), allocatable idc

  crop/landcover category:
  1 warm season annual legume
  2 cold season annual legume
  3 perennial legume
  4 warm season annual
  5 cold season annual
  6 perennial
  7 trees

- integer, dimension(:), allocatable **mat_yrs**
- real ∗8, dimension(:), allocatable bactpdb

  concentration of persistent bacteria in manure (fertilizer) (cfu/g manure)

- real ∗8, dimension(:), allocatable fminn

  fraction of mineral N (NO3 + NH3) (kg minN/kg fert)

- real ∗8, dimension(:), allocatable forgn

  fraction of organic N (kg orgN/kg fert)

- real ∗8, dimension(:), allocatable forgp

  fraction of organic P (kg orgP/kg fert)

- real ∗8, dimension(:), allocatable bactkddb

  bacteria partition coefficient (none):
  1: all bacteria in solution
  0: all bacteria sorbed to soil particles

- real ∗8, dimension(:), allocatable bactlpdb

  concentration of less persistent bacteria in manure (fertilizer) (cfu/g manure)

- real ∗8, dimension(:), allocatable fminp

  fraction of mineral P (kg minP/kg fert)

- real ∗8, dimension(:), allocatable fnh3n

  fraction of NH3-N in mineral N (kg NH3-N/kg minN)

- character(len=8), dimension(200) fertnm

  name of fertilizer

- real ∗8, dimension(:), allocatable curbden

  curb length density in HRU (km/ha)

- real ∗8, dimension(:), allocatable dirtmx

  maximum amount of solids allowed to build up on impervious surfaces (kg/curb km)

- real ∗8, dimension(:), allocatable fimp

  fraction of HRU area that is impervious (both directly and indirectly connected)(fraction)

- real ∗8, dimension(:), allocatable urbcoef

  wash-off coefficient for removal of constituents from an impervious surface (1/mm)

- real ∗8, dimension(:), allocatable thalf

  time for the amount of solids on impervious areas to build up to 1/2 the maximum level (days)

- real ∗8, dimension(:), allocatable tnconc

  concentration of total nitrogen in suspended solid load from impervious areas (mg N/kg sed)

- real ∗8, dimension(:), allocatable tno3conc

  concentration of NO3-N in suspended solid load from impervious areas (mg NO3-N/kg sed)
- real ∗8, dimension(:), allocatable tpconc

  concentration of total phosphorus in suspended solid load from impervious areas (mg P/kg sed)
- real ∗8, dimension(:), allocatable fcimp

  fraction of HRU area that is classified as directly connected impervious (fraction)
- real ∗8, dimension(:), allocatable urbcn2

  SCS curve number for moisture condition II in impervious areas (none)
- real ∗8 **sweepeff**
- real ∗8 **frt_kg**
- real ∗8 **pst_dep**
- real ∗8 **fr_curb**
- real ∗8, dimension(:), allocatable **ranrns_hru**
- integer, dimension(:), allocatable **itill**
- real ∗8, dimension(:), allocatable deptil

  depth of mixing caused by operation (mm)
- real ∗8, dimension(:), allocatable effmix

  mixing efficiency of operation (none)
- real ∗8, dimension(:), allocatable ranrns

  random roughness of a given tillage operation (mm)
- character(len=8), dimension(550) tillnm

  8-character name for the tillage operation
- real ∗8, dimension(:), allocatable rnum1s

  For ICODES equal to (none)
  0,1,3,5,9: not used
  2: Fraction of flow in channel
  4: amount of water transferred (as defined by INUM4S)
  7,8,10,11: drainage area in square kilometers associated with the record file.
- real ∗8, dimension(:), allocatable **hyd_dakm**
- real ∗8, dimension(:,:), allocatable **varoute**
- real ∗8, dimension(:,:), allocatable **shyd**
- real ∗8, dimension(:,:), allocatable **vartran**
- real ∗8, dimension(:,:,:), allocatable **hhvaroute**
- integer, dimension(:), allocatable icodes

  routing command code (none):
  0 = finish
  1 = subbasin
  2 = route
  3 = routres
  4 = transfer
  5 = add
  6 = rechour
  7 = recmon
  8 = recyear
  9 = save
  10 = recday
  11 = reccnst
  12 = structure
  13 = apex
  14 = saveconc
  15 =
- integer, dimension(:), allocatable ihouts

  For ICODES equal to (none)
  0: not used
  1,2,3,5,7,8,10,11: hydrograph storage location number
  4: departure type (1=reach, 2=reservoir)
  9: hydrograph storage location of data to be printed to event file
  14:hydrograph storage location of data to be printed to saveconc file.

- integer, dimension(:), allocatable inum1s

  For ICODES equal to (none)
  0: not used
  1: subbasin number
  2: reach number
  3: reservoir number
  4: reach or res # flow is diverted from
  5: hydrograph storage location of 1st dataset to be added
  7,8,9,10,11,14: file number.
- integer, dimension(:), allocatable inum2s

  For ICODES equal to (none)
  0,1,7,8,10,11: not used
  2,3: inflow hydrograph storage location
  4: destination type (1=reach, 2=reservoir)
  5: hydrograph storage location of 2nd dataset to be added
  9,14:print frequency (0=daily, 1=hourly)
- integer, dimension(:), allocatable inum3s

  For ICODES equal to (none)
  0,1,2,3,5,7,8,10,11: not used
  4: destination number. Reach or reservoir receiving water
  9: print format (0=normal, fixed format; 1=txt format for AV interface, recday)
- integer, dimension(:), allocatable inum4s

  For ICODES equal to (none)
  0,2,3,5,7,8,9,10,11: not used
  1: GIS code printed to output file (optional)
  4: rule code governing transfer of water (1=fraction transferred out, 2=min volume or flow left, 3=exact amount transferred)
- integer, dimension(:), allocatable **inum5s**
- integer, dimension(:), allocatable **inum6s**
- integer, dimension(:), allocatable **inum7s**
- integer, dimension(:), allocatable **inum8s**
- integer, dimension(:), allocatable **subed**
- character(len=10), dimension(:), allocatable **recmonps**
- character(len=10), dimension(:), allocatable **reccnstps**
- character(len=5), dimension(:), allocatable **subnum**
- character(len=4), dimension(:), allocatable **hruno**
- real ∗8, dimension(:), allocatable **grwat_n**
- real ∗8, dimension(:), allocatable **grwat_i**
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- real ∗8, dimension(:), allocatable **usle_ls**
- real ∗8, dimension(:), allocatable **phuacc**
- real ∗8, dimension(:), allocatable epco

  plant water uptake compensation factor (0-1)
- real ∗8, dimension(:), allocatable esco

  soil evaporation compensation factor (0-1)
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- real ∗8, dimension(:), allocatable **erorgp**
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  coefficient for pesticide drift directly onto stream (none)
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- real ∗8, dimension(:), allocatable **hru_fr**
- real ∗8, dimension(:), allocatable hru_km

  area of HRU in square kilometers (km^ 2)
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- real ∗8, dimension(:), allocatable **pnd_fr**
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- real ∗8, dimension(:), allocatable **bactlp_plt**
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- real ∗8, dimension(:), allocatable **bactlpq**
- real ∗8, dimension(:), allocatable **auto_eff**

- real ∗8, dimension(:), allocatable **sol_sw**
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- real ∗8, dimension(:), allocatable **chlaw**
- real ∗8, dimension(:), allocatable sno_hru

  amount of water stored as snow (mm H2O)
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- real ∗8, dimension(:), allocatable **hru_ra**
- real ∗8, dimension(:), allocatable **wet_orgn**
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- real ∗8, dimension(:), allocatable **usle_eifac**
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- real ∗8, dimension(:), allocatable **aird**
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- real ∗8, dimension(:), allocatable **sol_avpor**
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- real ∗8, dimension(:), allocatable **cht**
- real ∗8, dimension(:), allocatable **u10**
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- real ∗8, dimension(:), allocatable **shallirr**
- real ∗8, dimension(:), allocatable **deepirr**
- real ∗8, dimension(:), allocatable **lai_aamx**
- real ∗8, dimension(:), allocatable ch_l1

  longest tributary channel length in subbasin (km)
- real ∗8, dimension(:), allocatable **canstor**
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- real ∗8, dimension(:), allocatable **bio_trmp**
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- integer, dimension(:), allocatable **ipst_freq**
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- integer, dimension(:), allocatable **irr_sc**
- integer, dimension(:), allocatable **irr_no**
- integer, dimension(:), allocatable **imp_trig**
- integer, dimension(:), allocatable **fert_days**
- integer, dimension(:), allocatable **irr_sca**
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- integer, dimension(:), allocatable **wstrs_id**
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- real ∗8, dimension(:), allocatable **cumeira**
- real ∗8, dimension(:), allocatable **cumrt**
- real ∗8, dimension(:), allocatable **cumrai**
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- real ∗8, dimension(:), allocatable **gw_spyld**
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- real ∗8, dimension(:), allocatable **alpha_bfe_d**
- real ∗8, dimension(:), allocatable **gw_qdeep**
- real ∗8, dimension(:), allocatable **gw_delaye**
- real ∗8, dimension(:), allocatable **gw_revap**
- real ∗8, dimension(:), allocatable **rchrg_dp**
- real ∗8, dimension(:), allocatable anion_excl

  fraction of porosity from which anions are excluded
- real ∗8, dimension(:), allocatable **revapmn**
- real ∗8, dimension(:), allocatable **rchrg**
- real ∗8, dimension(:), allocatable **ffc**
- real ∗8, dimension(:), allocatable **bio_min**
- real ∗8, dimension(:), allocatable **surqsolp**
- real ∗8, dimension(:), allocatable **cklsp**
- real ∗8, dimension(:), allocatable **deepst**
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- real ∗8, dimension(:), allocatable **pplnt**

- real ∗8, dimension(:), allocatable **snotmp**
- real ∗8, dimension(:), allocatable gdrain

  drain tile lag time (hours)
- real ∗8, dimension(:), allocatable **ddrain**
- real ∗8, dimension(:), allocatable **sol_crk**
- real ∗8, dimension(:), allocatable **dayl**
- real ∗8, dimension(:), allocatable **brt**
- real ∗8, dimension(:), allocatable sstmaxd

  static maximum depressional storage; read from .sdr (mm)
- real ∗8, dimension(:), allocatable **ddrain_hru**
- real ∗8, dimension(:), allocatable **re**
- real ∗8, dimension(:), allocatable **sdrain**
- real ∗8, dimension(:), allocatable **stmaxd**
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- real ∗8, dimension(:), allocatable **rnd3**
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- real ∗8, dimension(:,:), allocatable **drydep_nh4_mo**
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- real ∗8, dimension(:,:), allocatable **psetlw**
- real ∗8, dimension(:,:), allocatable **pcpband**
- real ∗8, dimension(:,:), allocatable **wupnd**
- real ∗8, dimension(:,:), allocatable **tavband**
- real ∗8, dimension(:,:), allocatable **phi**
- real ∗8, dimension(:,:), allocatable **wat_phi**
- real ∗8, dimension(:,:), allocatable snoeb

  initial snow water content in elevation band (mm H2O)
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- real ∗8, dimension(:,:), allocatable **wudeep**

- real ∗8, dimension(:,:), allocatable **tmnband**
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- real ∗8, dimension(:,:), allocatable **laimx_upd**
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- integer, dimension(:), allocatable **nro**
- integer, dimension(:), allocatable **nrot**
- integer, dimension(:), allocatable **nfert**
- integer, dimension(:), allocatable **igro**
- integer, dimension(:), allocatable **nair**
- integer, dimension(:), allocatable **ipnd1**
- integer, dimension(:), allocatable **ipnd2**
- integer, dimension(:), allocatable **nirr**
- integer, dimension(:), allocatable **iflod1**
- integer, dimension(:), allocatable **iflod2**
- integer, dimension(:), allocatable **ndtarg**
- integer, dimension(:), allocatable **iafrttyp**
- integer, dimension(:), allocatable **nstress**
- integer, dimension(:), allocatable **igrotree**
- integer, dimension(:), allocatable **grz_days**
- integer, dimension(:), allocatable **nmgt**
- integer, dimension(:), allocatable **icr**
- integer, dimension(:), allocatable **ncut**
- integer, dimension(:), allocatable **nsweep**
- integer, dimension(:), allocatable **nafert**

- integer, dimension(:), allocatable **irn**
- integer, dimension(:), allocatable **irrno**
- integer, dimension(:), allocatable **sol_nly**
- integer, dimension(:), allocatable **npcp**
- integer, dimension(:), allocatable **igrz**
- integer, dimension(:), allocatable **ndeat**
- integer, dimension(:), allocatable **ngr**
- integer, dimension(:), allocatable **ncf**
- integer, dimension(:), allocatable hru_sub

  subbasin in which HRU is located (none)
- integer, dimension(:), allocatable **idorm**
- integer, dimension(:), allocatable **urblu**
- integer, dimension(:), allocatable **ldrain**
- integer, dimension(:), allocatable **hru_seq**
- integer, dimension(:), allocatable **iurban**
- integer, dimension(:), allocatable **iday_fert**
- integer, dimension(:), allocatable **icfrt**
- integer, dimension(:), allocatable ifld

  number of HRU (in subbasin) that is a floodplain (none)
- integer, dimension(:), allocatable irip

  number of HRU (in subbasin) that is a riparian zone (none)
- integer, dimension(:), allocatable **ndcfrt**
- integer, dimension(:), allocatable **hrugis**
- integer, dimension(:), allocatable **orig_igro**
- integer, dimension(:), allocatable **ntil**
- integer, dimension(:), allocatable **irrsc**
- integer, dimension(:), allocatable **iwatable**
- integer, dimension(:), allocatable **curyr_mat**
- integer, dimension(:), allocatable **ncpest**
- integer, dimension(:), allocatable **icpst**
- integer, dimension(:), allocatable **ndcpst**
- integer, dimension(:), allocatable **iday_pest**
- integer, dimension(:), allocatable **irr_flag**
- integer, dimension(:), allocatable **irra_flag**
- integer, dimension(:,:), allocatable rndseed

  random number generator seed. The seeds in the array are used to generate random numbers for the following purposes:
  (1) wet/dry day probability
  (2) solar radiation
  (3) precipitation
  (4) USLE rainfall erosion index
  (5) wind speed
  (6) 0.5 hr rainfall fraction
  (7) relative humidity
  (8) maximum temperature
  (9) minimum temperature
  (10) generate new random numbers
- integer, dimension(:,:), allocatable **iterr**
- integer, dimension(:,:), allocatable **iyterr**
- integer, dimension(:,:), allocatable **itdrain**
- integer, dimension(:,:), allocatable **iydrain**
- integer, dimension(:,:), allocatable **ncrops**
- integer, dimension(:), allocatable **manure_id**
- integer, dimension(:,:), allocatable **mgt_sdr**
- integer, dimension(:,:), allocatable **idplrot**

- integer, dimension(:,:), allocatable **icont**
- integer, dimension(:,:), allocatable **iycont**
- integer, dimension(:,:), allocatable **ifilt**
- integer, dimension(:,:), allocatable **iyfilt**
- integer, dimension(:,:), allocatable **istrip**
- integer, dimension(:,:), allocatable **iystrip**
- integer, dimension(:,:), allocatable **iopday**
- integer, dimension(:,:), allocatable **iopyr**
- integer, dimension(:,:), allocatable **mgt_ops**
- real ∗8, dimension(:), allocatable **wshd_pstap**
- real ∗8, dimension(:), allocatable **wshd_pstdg**
- integer, dimension(12) **ndmo**
- integer, dimension(:), allocatable **npno**
- integer, dimension(:), allocatable **mcrhru**
- character(len=13), dimension(18) rfile

  rainfall file names (.pcp)
- character(len=13), dimension(18) tfile

  temperature file names (.tmp)
- character(len=4), dimension(1000) urbname

  name of urban land use
- character(len=1), dimension(:), allocatable **hydgrp**
- character(len=1), dimension(:), allocatable **kirr**
- character(len=16), dimension(:), allocatable **snam**
- character(len=17), dimension(300) pname

  name of pesticide/toxin adding qtile to output.hru write 3/2/2010 gsm increased heds(70) to heds(71)
- character(len=13), dimension(79) **heds**
- character(len=13), dimension(24) **hedb**
- character(len=13), dimension(46) **hedr**
- character(len=13), dimension(41) **hedrsv**
- character(len=13), dimension(40) **hedwtr**
- character(len=4), dimension(60) title

  description lines in file.cio (1st 3 lines)
- character(len=4), dimension(5000) cpnm

  four character code to represent crop name
- character(len=17), dimension(50) **fname**
- real ∗8, dimension(:,:,:), allocatable **flomon**
- real ∗8, dimension(:,:,:), allocatable **solpstmon**
- real ∗8, dimension(:,:,:), allocatable **srbpstmon**
- real ∗8, dimension(:,:,:), allocatable **sedmon**
- real ∗8, dimension(:,:,:), allocatable **orgnmon**
- real ∗8, dimension(:,:,:), allocatable **orgpmon**
- real ∗8, dimension(:,:,:), allocatable **no3mon**
- real ∗8, dimension(:,:,:), allocatable **minpmon**
- real ∗8, dimension(:,:,:), allocatable **nh3mon**
- real ∗8, dimension(:,:,:), allocatable **no2mon**
- real ∗8, dimension(:,:,:), allocatable **bactpmon**
- real ∗8, dimension(:,:,:), allocatable **bactlpmon**
- real ∗8, dimension(:,:,:), allocatable **cmtl1mon**
- real ∗8, dimension(:,:,:), allocatable **cmtl2mon**
- real ∗8, dimension(:,:,:), allocatable **cmtl3mon**
- real ∗8, dimension(:,:,:), allocatable **chlamon**
- real ∗8, dimension(:,:,:), allocatable **disoxmon**
- real ∗8, dimension(:,:,:), allocatable **cbodmon**
- real ∗8, dimension(:,:), allocatable **floyr**

- real ∗8, dimension(:,:), allocatable **sedyr**
- real ∗8, dimension(:,:), allocatable **orgnyr**
- real ∗8, dimension(:,:), allocatable **orgpyr**
- real ∗8, dimension(:,:), allocatable **no3yr**
- real ∗8, dimension(:,:), allocatable **minpyr**
- real ∗8, dimension(:,:), allocatable **nh3yr**
- real ∗8, dimension(:,:), allocatable **no2yr**
- real ∗8, dimension(:,:), allocatable **bactpyr**
- real ∗8, dimension(:,:), allocatable **bactlpyr**
- real ∗8, dimension(:,:), allocatable **cmtl1yr**
- real ∗8, dimension(:,:), allocatable **cmtl2yr**
- real ∗8, dimension(:,:), allocatable **cmtl3yr**
- real ∗8, dimension(:,:), allocatable **chlayr**
- real ∗8, dimension(:,:), allocatable **disoxyr**
- real ∗8, dimension(:,:), allocatable **cbodyr**
- real ∗8, dimension(:,:), allocatable **solpstyr**
- real ∗8, dimension(:,:), allocatable **srbpstyr**
- real ∗8, dimension(:,:), allocatable **sol_mc**
- real ∗8, dimension(:,:), allocatable **sol_mn**
- real ∗8, dimension(:,:), allocatable **sol_mp**
- real ∗8, dimension(:), allocatable **flocnst**
- real ∗8, dimension(:), allocatable **sedcnst**
- real ∗8, dimension(:), allocatable **orgncnst**
- real ∗8, dimension(:), allocatable **orgpcnst**
- real ∗8, dimension(:), allocatable **no3cnst**
- real ∗8, dimension(:), allocatable **minpcnst**
- real ∗8, dimension(:), allocatable **nh3cnst**
- real ∗8, dimension(:), allocatable **no2cnst**
- real ∗8, dimension(:), allocatable **bactpcnst**
- real ∗8, dimension(:), allocatable **cmtl1cnst**
- real ∗8, dimension(:), allocatable **cmtl2cnst**
- real ∗8, dimension(:), allocatable **bactlpcnst**
- real ∗8, dimension(:), allocatable **cmtl3cnst**
- real ∗8, dimension(:), allocatable **chlacnst**
- real ∗8, dimension(:), allocatable **disoxcnst**
- real ∗8, dimension(:), allocatable **cbodcnst**
- real ∗8, dimension(:), allocatable **solpstcnst**
- real ∗8, dimension(:), allocatable **srbpstcnst**
- integer nstep

  max number of time steps per day
- integer idt

  length of time step used to report precipitation data for sub-daily modeling (minutes)
- real ∗8, dimension(:), allocatable **hrtwtr**
- real ∗8, dimension(:), allocatable **hhstor**
- real ∗8, dimension(:), allocatable **hdepth**
- real ∗8, dimension(:), allocatable **hsdti**
- real ∗8, dimension(:), allocatable **hrchwtr**
- real ∗8, dimension(:), allocatable **halgae**
- real ∗8, dimension(:), allocatable **horgn**
- real ∗8, dimension(:), allocatable **hnh4**
- real ∗8, dimension(:), allocatable **hno2**
- real ∗8, dimension(:), allocatable **hno3**
- real ∗8, dimension(:), allocatable **horgp**
- real ∗8, dimension(:), allocatable **hsolp**

- real ∗8, dimension(:), allocatable **hbod**
- real ∗8, dimension(:), allocatable **hdisox**
- real ∗8, dimension(:), allocatable **hchla**
- real ∗8, dimension(:), allocatable **hsedyld**
- real ∗8, dimension(:), allocatable **hsedst**
- real ∗8, dimension(:), allocatable **hharea**
- real ∗8, dimension(:), allocatable **hsolpst**
- real ∗8, dimension(:), allocatable **hsorpst**
- real ∗8, dimension(:), allocatable **hhqday**
- real ∗8, dimension(:), allocatable **precipdt**
- real ∗8, dimension(:), allocatable **hhtime**
- real ∗8, dimension(:), allocatable **hbactp**
- real ∗8, dimension(:), allocatable **hbactlp**
- integer, dimension(10) **ivar_orig**
- real ∗8, dimension(10) **rvar_orig**
- integer nsave

  number of save commands in .fig file
- integer **nauto**
- integer **iatmodep**
- real ∗8, dimension(:), allocatable **wattemp**
- real ∗8, dimension(:), allocatable **lkpst_mass**
- real ∗8, dimension(:), allocatable **lkspst_mass**
- real ∗8, dimension(:), allocatable **vel_chan**
- real ∗8, dimension(:), allocatable **vfscon**
- real ∗8, dimension(:), allocatable **vfsratio**
- real ∗8, dimension(:), allocatable **vfsch**
- real ∗8, dimension(:), allocatable **vfsi**
- real ∗8, dimension(:,:), allocatable **filter_i**
- real ∗8, dimension(:,:), allocatable **filter_ratio**
- real ∗8, dimension(:,:), allocatable **filter_con**
- real ∗8, dimension(:,:), allocatable **filter_ch**
- real ∗8, dimension(:,:), allocatable **sol_n**
- integer cswat

  = 0 Static soil carbon (old mineralization routines)
  = 1 C-FARM one carbon pool model
  = 2 Century model
- real ∗8, dimension(:,:), allocatable **sol_bdp**
- real ∗8, dimension(:,:), allocatable **tillagef**
- real ∗8, dimension(:), allocatable **rtfr**
- real ∗8, dimension(:), allocatable **stsol_rd**
- integer **urban_flag**
- integer **dorm_flag**
- real ∗8 **bf_flg**
- real ∗8 **iabstr**
- real ∗8, dimension(:), allocatable **ubnrunoff**
- real ∗8, dimension(:), allocatable **ubntss**
- real ∗8, dimension(:,:), allocatable **sub_ubnrunoff**
- real ∗8, dimension(:,:), allocatable **sub_ubntss**
- real ∗8, dimension(:,:), allocatable **ovrlnd_dt**
- real ∗8, dimension(:,:,:), allocatable **hhsurf_bs**
- integer iuh

  unit hydrograph method: 1=triangular UH; 2=gamma funtion UH;
- integer sed_ch

  channel routing for HOURLY; 0=Bagnold; 2=Brownlie; 3=Yang;

- real ∗8 eros_expo

  an exponent in the overland flow erosion equation ranges 1.5-3.0
- real ∗8 eros_spl

  coefficient of splash erosion varing 0.9-3.1
- real ∗8 rill_mult

  Multiplier to USLE_K for soil susceptible to rill erosion, range 0.5-2.0.
- real ∗8 **sedprev**
- real ∗8 **c_factor**
- real ∗8 ch_d50

  median particle diameter of channel bed (mm)
- real ∗8 sig_g

  geometric standard deviation of particle sizes for the main channel. Mean air temperature at which precipitation is equally likely to be rain as snow/freezing rain.
- real ∗8 uhalpha

  alpha coefficient for estimating unit hydrograph using a gamma function (∗.bsn)
- real ∗8 **abstinit**
- real ∗8 **abstmax**
- real ∗8, dimension(:,:), allocatable **hhsedy**
- real ∗8, dimension(:,:), allocatable **sub_subp_dt**
- real ∗8, dimension(:,:), allocatable **sub_hhsedy**
- real ∗8, dimension(:,:), allocatable **sub_atmp**
- real ∗8, dimension(:), allocatable **rhy**
- real ∗8, dimension(:), allocatable **init_abstrc**
- real ∗8, dimension(:), allocatable **dratio**
- real ∗8, dimension(:), allocatable **hrtevp**
- real ∗8, dimension(:), allocatable **hrttlc**
- real ∗8, dimension(:,:,:), allocatable **rchhr**
- real ∗8, dimension(:), allocatable **hhresflwi**
- real ∗8, dimension(:), allocatable **hhresflwo**
- real ∗8, dimension(:), allocatable **hhressedi**
- real ∗8, dimension(:), allocatable **hhressedo**
- character(len=4), dimension(:), allocatable **lu_nodrain**
- integer, dimension(:), allocatable **bmpdrain**
- real ∗8, dimension(:), allocatable **sub_cn2**
- real ∗8, dimension(:), allocatable **sub_ha_urb**
- real ∗8, dimension(:), allocatable **bmp_recharge**
- real ∗8, dimension(:), allocatable **sub_ha_imp**
- real ∗8, dimension(:), allocatable **subdr_km**
- real ∗8, dimension(:), allocatable **subdr_ickm**
- real ∗8, dimension(:,:), allocatable **sf_im**
- real ∗8, dimension(:,:), allocatable **sf_iy**
- real ∗8, dimension(:,:), allocatable **sp_sa**
- real ∗8, dimension(:,:), allocatable **sp_pvol**
- real ∗8, dimension(:,:), allocatable **sp_pd**
- real ∗8, dimension(:,:), allocatable **sp_sedi**
- real ∗8, dimension(:,:), allocatable **sp_sede**
- real ∗8, dimension(:,:), allocatable **ft_sa**
- real ∗8, dimension(:,:), allocatable **ft_fsa**
- real ∗8, dimension(:,:), allocatable **ft_dep**
- real ∗8, dimension(:,:), allocatable **ft_h**
- real ∗8, dimension(:,:), allocatable **ft_pd**
- real ∗8, dimension(:,:), allocatable **ft_k**
- real ∗8, dimension(:,:), allocatable **ft_dp**
- real ∗8, dimension(:,:), allocatable **ft_dc**

- real ∗8, dimension(:,:), allocatable **ft_por**
- real ∗8, dimension(:,:), allocatable **tss_den**
- real ∗8, dimension(:,:), allocatable **ft_alp**
- real ∗8, dimension(:,:), allocatable **sf_fr**
- real ∗8, dimension(:,:), allocatable **sp_qi**
- real ∗8, dimension(:,:), allocatable **sp_k**
- real ∗8, dimension(:,:), allocatable **ft_qpnd**
- real ∗8, dimension(:,:), allocatable **sp_dp**
- real ∗8, dimension(:,:), allocatable **ft_qsw**
- real ∗8, dimension(:,:), allocatable **ft_qin**
- real ∗8, dimension(:,:), allocatable **ft_qout**
- real ∗8, dimension(:,:), allocatable **ft_sedpnd**
- real ∗8, dimension(:,:), allocatable **sp_bpw**
- real ∗8, dimension(:,:), allocatable **ft_bpw**
- real ∗8, dimension(:,:), allocatable **ft_sed_cumul**
- real ∗8, dimension(:,:), allocatable **sp_sed_cumul**
- integer, dimension(:), allocatable **num_sf**
- integer, dimension(:,:), allocatable **sf_typ**
- integer, dimension(:,:), allocatable **sf_dim**
- integer, dimension(:,:), allocatable **ft_qfg**
- integer, dimension(:,:), allocatable **sp_qfg**
- integer, dimension(:,:), allocatable **sf_ptp**
- integer, dimension(:,:), allocatable **ft_fc**
- real ∗8 **sfsedmean**
- real ∗8 **sfsedstdev**
- integer, dimension(:), allocatable **dtp_subnum**
- integer, dimension(:), allocatable **dtp_imo**
- integer, dimension(:), allocatable **dtp_iyr**
- integer, dimension(:), allocatable **dtp_numweir**
- integer, dimension(:), allocatable **dtp_numstage**
- integer, dimension(:), allocatable **dtp_stagdis**
- integer, dimension(:), allocatable **dtp_reltype**
- integer, dimension(:), allocatable **dtp_onoff**
- real ∗8, dimension(:), allocatable **cf**
- real ∗8, dimension(:), allocatable **cfh**
- real ∗8, dimension(:), allocatable **cfdec**
- real ∗8, dimension(:), allocatable **lat_orgn**
- real ∗8, dimension(:), allocatable **lat_orgp**
- integer, dimension(:,:), allocatable **dtp_weirtype**
- integer, dimension(:,:), allocatable **dtp_weirdim**
- real ∗8, dimension(:), allocatable **dtp_evrsv**
- real ∗8, dimension(:), allocatable **dtp_inflvol**
- real ∗8, dimension(:), allocatable **dtp_totwrwid**
- real ∗8, dimension(:), allocatable **dtp_lwratio**
- real ∗8, dimension(:), allocatable **dtp_wdep**
- real ∗8, dimension(:), allocatable **dtp_totdep**
- real ∗8, dimension(:), allocatable **dtp_watdepact**
- real ∗8, dimension(:), allocatable **dtp_outflow**
- real ∗8, dimension(:), allocatable **dtp_totrel**
- real ∗8, dimension(:), allocatable **dtp_backoff**
- real ∗8, dimension(:), allocatable **dtp_seep_sa**
- real ∗8, dimension(:), allocatable **dtp_evap_sa**
- real ∗8, dimension(:), allocatable **dtp_pet_day**
- real ∗8, dimension(:), allocatable **dtp_pcpvol**
- real ∗8, dimension(:), allocatable **dtp_seepvol**

- real ∗8, dimension(:), allocatable **dtp_evapvol**
- real ∗8, dimension(:), allocatable **dtp_flowin**
- real ∗8, dimension(:), allocatable **dtp_backup_length**
- real ∗8, dimension(:), allocatable **dtp_intcept**
- real ∗8, dimension(:), allocatable **dtp_expont**
- real ∗8, dimension(:), allocatable **dtp_coef1**
- real ∗8, dimension(:), allocatable **dtp_coef2**
- real ∗8, dimension(:), allocatable **dtp_coef3**
- real ∗8, dimension(:), allocatable **dtp_dummy1**
- real ∗8, dimension(:), allocatable **dtp_dummy2**
- real ∗8, dimension(:), allocatable **dtp_dummy3**
- real ∗8, dimension(:), allocatable **dtp_ivol**
- real ∗8, dimension(:), allocatable **dtp_ised**
- integer, dimension(:,:), allocatable **so_res_flag**
- integer, dimension(:,:), allocatable **ro_bmp_flag**
- real ∗8, dimension(:,:), allocatable **sol_watp**
- real ∗8, dimension(:,:), allocatable **sol_solp_pre**
- real ∗8, dimension(:,:), allocatable **psp_store**
- real ∗8, dimension(:,:), allocatable **ssp_store**
- real ∗8, dimension(:,:), allocatable **so_res**
- real ∗8, dimension(:,:), allocatable **sol_cal**
- real ∗8, dimension(:,:), allocatable **sol_ph**
- integer **sol_p_model**
- integer, dimension(:,:), allocatable **a_days**
- integer, dimension(:,:), allocatable **b_days**
- real ∗8, dimension(:), allocatable **harv_min**
- real ∗8, dimension(:), allocatable **fstap**
- real ∗8, dimension(:), allocatable **min_res**
- real ∗8, dimension(:,:), allocatable **ro_bmp_flo**
- real ∗8, dimension(:,:), allocatable **ro_bmp_sed**
- real ∗8, dimension(:,:), allocatable **ro_bmp_bac**
- real ∗8, dimension(:,:), allocatable **ro_bmp_pp**
- real ∗8, dimension(:,:), allocatable **ro_bmp_sp**
- real ∗8, dimension(:,:), allocatable **ro_bmp_pn**
- real ∗8, dimension(:,:), allocatable **ro_bmp_sn**
- real ∗8, dimension(:,:), allocatable **ro_bmp_flos**
- real ∗8, dimension(:,:), allocatable **ro_bmp_seds**
- real ∗8, dimension(:,:), allocatable **ro_bmp_bacs**
- real ∗8, dimension(:,:), allocatable **ro_bmp_pps**
- real ∗8, dimension(:,:), allocatable **ro_bmp_sps**
- real ∗8, dimension(:,:), allocatable **ro_bmp_pns**
- real ∗8, dimension(:,:), allocatable **ro_bmp_sns**
- real ∗8, dimension(:,:), allocatable **ro_bmp_flot**
- real ∗8, dimension(:,:), allocatable **ro_bmp_sedt**
- real ∗8, dimension(:,:), allocatable **ro_bmp_bact**
- real ∗8, dimension(:,:), allocatable **ro_bmp_ppt**
- real ∗8, dimension(:,:), allocatable **ro_bmp_spt**
- real ∗8, dimension(:,:), allocatable **ro_bmp_pnt**
- real ∗8, dimension(:,:), allocatable **ro_bmp_snt**
- real ∗8, dimension(:), allocatable **bmp_flo**
- real ∗8, dimension(:), allocatable **bmp_sed**
- real ∗8, dimension(:), allocatable **bmp_bac**
- real ∗8, dimension(:), allocatable **bmp_pp**
- real ∗8, dimension(:), allocatable **bmp_sp**
- real ∗8, dimension(:), allocatable **bmp_pn**

- real ∗8, dimension(:), allocatable **bmp_sn**
- real ∗8, dimension(:), allocatable **bmp_flag**
- real ∗8, dimension(:), allocatable **bmp_flos**
- real ∗8, dimension(:), allocatable **bmp_seds**
- real ∗8, dimension(:), allocatable **bmp_bacs**
- real ∗8, dimension(:), allocatable **bmp_pps**
- real ∗8, dimension(:), allocatable **bmp_sps**
- real ∗8, dimension(:), allocatable **bmp_pns**
- real ∗8, dimension(:), allocatable **bmp_sns**
- real ∗8, dimension(:), allocatable **bmp_flot**
- real ∗8, dimension(:), allocatable **bmp_sedt**
- real ∗8, dimension(:), allocatable **bmp_bact**
- real ∗8, dimension(:), allocatable **bmp_ppt**
- real ∗8, dimension(:), allocatable **bmp_spt**
- real ∗8, dimension(:), allocatable **bmp_pnt**
- real ∗8, dimension(:), allocatable **bmp_snt**
- real ∗8, dimension(:,:), allocatable **dtp_wdratio**
- real ∗8, dimension(:,:), allocatable **dtp_depweir**
- real ∗8, dimension(:,:), allocatable **dtp_diaweir**
- real ∗8, dimension(:,:), allocatable **dtp_retperd**
- real ∗8, dimension(:,:), allocatable **dtp_pcpret**
- real ∗8, dimension(:,:), allocatable **dtp_cdis**
- real ∗8, dimension(:,:), allocatable **dtp_flowrate**
- real ∗8, dimension(:,:), allocatable **dtp_wrwid**
- real ∗8, dimension(:,:), allocatable **dtp_addon**
- real ∗8, dimension(:), allocatable **ri_subkm**
- real ∗8, dimension(:), allocatable **ri_totpvol**
- real ∗8, dimension(:), allocatable **irmmdt**
- real ∗8, dimension(:,:), allocatable **ri_sed**
- real ∗8, dimension(:,:), allocatable **ri_fr**
- real ∗8, dimension(:,:), allocatable **ri_dim**
- real ∗8, dimension(:,:), allocatable **ri_im**
- real ∗8, dimension(:,:), allocatable **ri_iy**
- real ∗8, dimension(:,:), allocatable **ri_sa**
- real ∗8, dimension(:,:), allocatable **ri_vol**
- real ∗8, dimension(:,:), allocatable **ri_qi**
- real ∗8, dimension(:,:), allocatable **ri_k**
- real ∗8, dimension(:,:), allocatable **ri_dd**
- real ∗8, dimension(:,:), allocatable **ri_evrsv**
- real ∗8, dimension(:,:), allocatable **ri_dep**
- real ∗8, dimension(:,:), allocatable **ri_ndt**
- real ∗8, dimension(:,:), allocatable **ri_pmpvol**
- real ∗8, dimension(:,:), allocatable **ri_sed_cumul**
- real ∗8, dimension(:,:), allocatable **hrnopcp**
- real ∗8, dimension(:,:), allocatable **ri_qloss**
- real ∗8, dimension(:,:), allocatable **ri_pumpv**
- real ∗8, dimension(:,:), allocatable **ri_sedi**
- character(len=4), dimension(:,:), allocatable **ri_nirr**
- integer, dimension(:), allocatable **num_ri**
- integer, dimension(:), allocatable **ri_luflg**
- integer, dimension(:), allocatable **num_noirr**
- integer, dimension(:), allocatable **wtp_subnum**
- integer, dimension(:), allocatable **wtp_onoff**
- integer, dimension(:), allocatable **wtp_imo**
- integer, dimension(:), allocatable **wtp_iyr**

- integer, dimension(:), allocatable **wtp_dim**
- integer, dimension(:), allocatable **wtp_stagdis**
- integer, dimension(:), allocatable **wtp_sdtype**
- real ∗8, dimension(:), allocatable **wtp_pvol**
- real ∗8, dimension(:), allocatable **wtp_pdepth**
- real ∗8, dimension(:), allocatable **wtp_sdslope**
- real ∗8, dimension(:), allocatable **wtp_lenwdth**
- real ∗8, dimension(:), allocatable **wtp_extdepth**
- real ∗8, dimension(:), allocatable **wtp_hydeff**
- real ∗8, dimension(:), allocatable **wtp_evrsv**
- real ∗8, dimension(:), allocatable **wtp_sdintc**
- real ∗8, dimension(:), allocatable **wtp_sdexp**
- real ∗8, dimension(:), allocatable **wtp_sdc1**
- real ∗8, dimension(:), allocatable **wtp_sdc2**
- real ∗8, dimension(:), allocatable **wtp_sdc3**
- real ∗8, dimension(:), allocatable **wtp_pdia**
- real ∗8, dimension(:), allocatable **wtp_plen**
- real ∗8, dimension(:), allocatable **wtp_pmann**
- real ∗8, dimension(:), allocatable **wtp_ploss**
- real ∗8, dimension(:), allocatable **wtp_k**
- real ∗8, dimension(:), allocatable **wtp_dp**
- real ∗8, dimension(:), allocatable **wtp_sedi**
- real ∗8, dimension(:), allocatable **wtp_sede**
- real ∗8, dimension(:), allocatable **wtp_qi**
- real ∗8 **bio_init**
- real ∗8 **lai_init**
- real ∗8 **cnop**
- real ∗8 **hi_ovr**
- real ∗8 **harveff**
- real ∗8 **frac_harvk**
- real ∗8 **lid_vgcl**
- real ∗8 **lid_vgcm**
- real ∗8 **lid_qsurf_total**
- real ∗8 **lid_farea_sum**
- real ∗8, dimension(:,:), allocatable **lid_cuminf_last**
- real ∗8, dimension(:,:), allocatable **lid_sw_last**
- real ∗8, dimension(:,:), allocatable **interval_last**
- real ∗8, dimension(:,:), allocatable **lid_f_last**
- real ∗8, dimension(:,:), allocatable **lid_cumr_last**
- real ∗8, dimension(:,:), allocatable **lid_str_last**
- real ∗8, dimension(:,:), allocatable **lid_farea**
- real ∗8, dimension(:,:), allocatable **lid_qsurf**
- real ∗8, dimension(:,:), allocatable **lid_sw_add**
- real ∗8, dimension(:,:), allocatable **lid_cumqperc_last**
- real ∗8, dimension(:,:), allocatable **lid_cumirr_last**
- real ∗8, dimension(:,:), allocatable **lid_excum_last**
- integer, dimension(:,:), allocatable **gr_onoff**
- integer, dimension(:,:), allocatable **gr_imo**
- integer, dimension(:,:), allocatable **gr_iyr**
- real ∗8, dimension(:,:), allocatable **gr_farea**
- real ∗8, dimension(:,:), allocatable **gr_solop**
- real ∗8, dimension(:,:), allocatable **gr_etcoef**
- real ∗8, dimension(:,:), allocatable **gr_fc**
- real ∗8, dimension(:,:), allocatable **gr_wp**
- real ∗8, dimension(:,:), allocatable **gr_ksat**

- real ∗8, dimension(:,:), allocatable **gr_por**
- real ∗8, dimension(:,:), allocatable **gr_hydeff**
- real ∗8, dimension(:,:), allocatable **gr_soldpt**
- real ∗8, dimension(:,:), allocatable **gr_dummy1**
- real ∗8, dimension(:,:), allocatable **gr_dummy2**
- real ∗8, dimension(:,:), allocatable **gr_dummy3**
- real ∗8, dimension(:,:), allocatable **gr_dummy4**
- real ∗8, dimension(:,:), allocatable **gr_dummy5**
- integer, dimension(:,:), allocatable **rg_onoff**
- integer, dimension(:,:), allocatable **rg_imo**
- integer, dimension(:,:), allocatable **rg_iyr**
- real ∗8, dimension(:,:), allocatable **rg_farea**
- real ∗8, dimension(:,:), allocatable **rg_solop**
- real ∗8, dimension(:,:), allocatable **rg_etcoef**
- real ∗8, dimension(:,:), allocatable **rg_fc**
- real ∗8, dimension(:,:), allocatable **rg_wp**
- real ∗8, dimension(:,:), allocatable **rg_ksat**
- real ∗8, dimension(:,:), allocatable **rg_por**
- real ∗8, dimension(:,:), allocatable **rg_hydeff**
- real ∗8, dimension(:,:), allocatable **rg_soldpt**
- real ∗8, dimension(:,:), allocatable **rg_dimop**
- real ∗8, dimension(:,:), allocatable **rg_sarea**
- real ∗8, dimension(:,:), allocatable **rg_vol**
- real ∗8, dimension(:,:), allocatable **rg_sth**
- real ∗8, dimension(:,:), allocatable **rg_sdia**
- real ∗8, dimension(:,:), allocatable **rg_bdia**
- real ∗8, dimension(:,:), allocatable **rg_sts**
- real ∗8, dimension(:,:), allocatable **rg_orifice**
- real ∗8, dimension(:,:), allocatable **rg_oheight**
- real ∗8, dimension(:,:), allocatable **rg_odia**
- real ∗8, dimension(:,:), allocatable **rg_dummy1**
- real ∗8, dimension(:,:), allocatable **rg_dummy2**
- real ∗8, dimension(:,:), allocatable **rg_dummy3**
- real ∗8, dimension(:,:), allocatable **rg_dummy4**
- real ∗8, dimension(:,:), allocatable **rg_dummy5**
- integer, dimension(:,:), allocatable **cs_onoff**
- integer, dimension(:,:), allocatable **cs_imo**
- integer, dimension(:,:), allocatable **cs_iyr**
- integer, dimension(:,:), allocatable **cs_grcon**
- real ∗8, dimension(:,:), allocatable **cs_farea**
- real ∗8, dimension(:,:), allocatable **cs_vol**
- real ∗8, dimension(:,:), allocatable **cs_rdepth**
- real ∗8, dimension(:,:), allocatable **cs_dummy1**
- real ∗8, dimension(:,:), allocatable **cs_dummy2**
- real ∗8, dimension(:,:), allocatable **cs_dummy3**
- real ∗8, dimension(:,:), allocatable **cs_dummy4**
- real ∗8, dimension(:,:), allocatable **cs_dummy5**
- integer, dimension(:,:), allocatable **pv_onoff**
- integer, dimension(:,:), allocatable **pv_imo**
- integer, dimension(:,:), allocatable **pv_iyr**
- integer, dimension(:,:), allocatable **pv_solop**
- real ∗8, dimension(:,:), allocatable **pv_grvdep**
- real ∗8, dimension(:,:), allocatable **pv_grvpor**
- real ∗8, dimension(:,:), allocatable **pv_farea**
- real ∗8, dimension(:,:), allocatable **pv_drcoef**

- real ∗8, dimension(:,:), allocatable **pv_fc**
- real ∗8, dimension(:,:), allocatable **pv_wp**
- real ∗8, dimension(:,:), allocatable **pv_ksat**
- real ∗8, dimension(:,:), allocatable **pv_por**
- real ∗8, dimension(:,:), allocatable **pv_hydeff**
- real ∗8, dimension(:,:), allocatable **pv_soldpt**
- real ∗8, dimension(:,:), allocatable **pv_dummy1**
- real ∗8, dimension(:,:), allocatable **pv_dummy2**
- real ∗8, dimension(:,:), allocatable **pv_dummy3**
- real ∗8, dimension(:,:), allocatable **pv_dummy4**
- real ∗8, dimension(:,:), allocatable **pv_dummy5**
- integer, dimension(:,:), allocatable **lid_onoff**
- real ∗8, dimension(:,:), allocatable **sol_bmc**
- real ∗8, dimension(:,:), allocatable **sol_bmn**
- real ∗8, dimension(:,:), allocatable **sol_hsc**
- real ∗8, dimension(:,:), allocatable **sol_hsn**
- real ∗8, dimension(:,:), allocatable **sol_hpc**
- real ∗8, dimension(:,:), allocatable **sol_hpn**
- real ∗8, dimension(:,:), allocatable **sol_lm**
- real ∗8, dimension(:,:), allocatable **sol_lmc**
- real ∗8, dimension(:,:), allocatable **sol_lmn**
- real ∗8, dimension(:,:), allocatable **sol_ls**
- real ∗8, dimension(:,:), allocatable **sol_lsl**
- real ∗8, dimension(:,:), allocatable **sol_lsc**
- real ∗8, dimension(:,:), allocatable **sol_lsn**
- real ∗8, dimension(:,:), allocatable **sol_rnmn**
- real ∗8, dimension(:,:), allocatable **sol_lslc**
- real ∗8, dimension(:,:), allocatable **sol_lslnc**
- real ∗8, dimension(:,:), allocatable **sol_rspc**
- real ∗8, dimension(:,:), allocatable **sol_woc**
- real ∗8, dimension(:,:), allocatable **sol_won**
- real ∗8, dimension(:,:), allocatable **sol_hp**
- real ∗8, dimension(:,:), allocatable **sol_hs**
- real ∗8, dimension(:,:), allocatable **sol_bm**
- real ∗8, dimension(:,:), allocatable **sol_cac**
- real ∗8, dimension(:,:), allocatable **sol_cec**
- real ∗8, dimension(:,:), allocatable **sol_percc**
- real ∗8, dimension(:,:), allocatable **sol_latc**
- real ∗8, dimension(:), allocatable **sedc_d**
- real ∗8, dimension(:), allocatable **surfqc_d**
- real ∗8, dimension(:), allocatable **latc_d**
- real ∗8, dimension(:), allocatable **percc_d**
- real ∗8, dimension(:), allocatable **foc_d**
- real ∗8, dimension(:), allocatable **nppc_d**
- real ∗8, dimension(:), allocatable **rsdc_d**
- real ∗8, dimension(:), allocatable **grainc_d**
- real ∗8, dimension(:), allocatable **stoverc_d**
- real ∗8, dimension(:), allocatable **soc_d**
- real ∗8, dimension(:), allocatable **rspc_d**
- real ∗8, dimension(:), allocatable **emitc_d**
- real ∗8, dimension(:), allocatable **sub_sedc_d**
- real ∗8, dimension(:), allocatable **sub_surfqc_d**
- real ∗8, dimension(:), allocatable **sub_latc_d**
- real ∗8, dimension(:), allocatable **sub_percc_d**
- real ∗8, dimension(:), allocatable **sub_foc_d**

- real ∗8, dimension(:), allocatable **sub_nppc_d**
- real ∗8, dimension(:), allocatable **sub_rsdc_d**
- real ∗8, dimension(:), allocatable **sub_grainc_d**
- real ∗8, dimension(:), allocatable **sub_stoverc_d**
- real ∗8, dimension(:), allocatable **sub_emitc_d**
- real ∗8, dimension(:), allocatable **sub_soc_d**
- real ∗8, dimension(:), allocatable **sub_rspc_d**
- real ∗8, dimension(:), allocatable **sedc_m**
- real ∗8, dimension(:), allocatable **surfqc_m**
- real ∗8, dimension(:), allocatable **latc_m**
- real ∗8, dimension(:), allocatable **percc_m**
- real ∗8, dimension(:), allocatable **foc_m**
- real ∗8, dimension(:), allocatable **nppc_m**
- real ∗8, dimension(:), allocatable **rsdc_m**
- real ∗8, dimension(:), allocatable **grainc_m**
- real ∗8, dimension(:), allocatable **stoverc_m**
- real ∗8, dimension(:), allocatable **emitc_m**
- real ∗8, dimension(:), allocatable **soc_m**
- real ∗8, dimension(:), allocatable **rspc_m**
- real ∗8, dimension(:), allocatable **sedc_a**
- real ∗8, dimension(:), allocatable **surfqc_a**
- real ∗8, dimension(:), allocatable **latc_a**
- real ∗8, dimension(:), allocatable **percc_a**
- real ∗8, dimension(:), allocatable **foc_a**
- real ∗8, dimension(:), allocatable **nppc_a**
- real ∗8, dimension(:), allocatable **rsdc_a**
- real ∗8, dimension(:), allocatable **grainc_a**
- real ∗8, dimension(:), allocatable **stoverc_a**
- real ∗8, dimension(:), allocatable **emitc_a**
- real ∗8, dimension(:), allocatable **soc_a**
- real ∗8, dimension(:), allocatable **rspc_a**
- integer, dimension(:), allocatable **tillage_switch**
- real ∗8, dimension(:), allocatable **tillage_depth**
- integer, dimension(:), allocatable **tillage_days**
- real ∗8, dimension(:), allocatable **tillage_factor**
- real ∗8 dthy

  time interval for subdaily routing
- integer, dimension(4) **ihx**
- integer, dimension(:), allocatable **nhy**
- real ∗8, dimension(:), allocatable **rchx**
- real ∗8, dimension(:), allocatable **rcss**
- real ∗8, dimension(:), allocatable **qcap**
- real ∗8, dimension(:), allocatable **chxa**
- real ∗8, dimension(:), allocatable **chxp**
- real ∗8, dimension(:,:,:), allocatable **qhy**
- real ∗8 **ff1**
- real ∗8 **ff2**

5.1.1 Detailed Description

main module containing the global variables

5.1.2 Variable Documentation

5.1.2.1 igropt

```
integer parm::igropt
```

Qual2E option for calculating the local specific growth rate of algae
1: multiplicative.

$$u = mumax\ fll\ fnn\ fpp$$

2: limiting nutrient

$$u = mumax\ fll\ \min(fnn,\ fpp)$$

3: harmonic mean

$$u = mumax\ fll\ \frac{2}{\frac{1}{fnn} + \frac{1}{fpp}}$$

Chapter 6

Data Type Documentation

6.1 parm::ascrv Interface Reference

Public Member Functions

- subroutine **ascrv** (x1, x2, x3, x4, x5, x6)

The documentation for this interface was generated from the following file:

- modparm.f90

6.2 parm::atri Interface Reference

Public Member Functions

- real ∗8 function **atri** (at1, at2, at3, at4i)

The documentation for this interface was generated from the following file:

- modparm.f90

6.3 parm::aunif Interface Reference

Public Member Functions

- real ∗8 function **aunif** (x1)

The documentation for this interface was generated from the following file:

- modparm.f90

6.4 parm::dstn1 Interface Reference

Public Member Functions

- real ∗8 function **dstn1** (rn1, rn2)

The documentation for this interface was generated from the following file:

- modparm.f90

6.5 parm::ee Interface Reference

Public Member Functions

- real ∗8 function **ee** (tk)

The documentation for this interface was generated from the following file:

- modparm.f90

6.6 parm::expo Interface Reference

Public Member Functions

- real ∗8 function **expo** (xx)

The documentation for this interface was generated from the following file:

- modparm.f90

6.7 parm::fcgd Interface Reference

Public Member Functions

- real ∗8 function **fcgd** (xx)

The documentation for this interface was generated from the following file:

- modparm.f90

6.8 parm::HQDAV Interface Reference

Public Member Functions

- subroutine **hqdav** (A, CBW, QQ, SSS, ZCH, ZX, CHW, FPW, jrch)

The documentation for this interface was generated from the following file:

- modparm.f90

6.9 parm::layersplit Interface Reference

Public Member Functions

- subroutine **layersplit** (dep_new)

The documentation for this interface was generated from the following file:

- modparm.f90

6.10 parm::ndenit Interface Reference

Public Member Functions

- subroutine **ndenit** (k, j, cdg, wdn, void)

The documentation for this interface was generated from the following file:

- modparm.f90

6.11 parm::qman Interface Reference

Public Member Functions

- real ∗8 function **qman** (x1, x2, x3, x4)

The documentation for this interface was generated from the following file:

- modparm.f90

6.12 parm::regres Interface Reference

Public Member Functions

- real ∗8 function **regres** (k)

The documentation for this interface was generated from the following file:

- modparm.f90

6.13 parm::rsedaa Interface Reference

Public Member Functions

- subroutine **rsedaa** (years)

The documentation for this interface was generated from the following file:

- modparm.f90

6.14 parm::tair Interface Reference

Public Member Functions

- real ∗8 function **tair** (hr, jj)

The documentation for this interface was generated from the following file:

- modparm.f90

6.15 parm::theta Interface Reference

Public Member Functions

- real ∗8 function **theta** (r20, thk, tmp)

The documentation for this interface was generated from the following file:

- modparm.f90

6.16 parm::vbl Interface Reference

Public Member Functions

- subroutine **vbl** (evx, spx, pp, qin, ox, vx1, vy, yi, yo, ysx, vf, vyf, aha)

The documentation for this interface was generated from the following file:

- modparm.f90

Chapter 7

File Documentation

7.1 allocate_parms.f90 File Reference

this subroutine allocates array sizes

Functions/Subroutines

- subroutine **allocate_parms**

7.1.1 Detailed Description

this subroutine allocates array sizes

Author

modified by Javier Burguete

7.2 ascrv.f90 File Reference

Functions/Subroutines

- subroutine **ascrv** (x1, x2, x3, x4, x5, x6)

7.2.1 Detailed Description

file containing the subroutine ascrv

Author

modified by Javier Burguete

this subroutine computes shape parameters x5 and x6 for the S curve equation

$$x = \frac{y}{y + \exp(x5 + x6\, y)}$$

given 2 (x,y) points along the curve. x5 is determined by solving the equation with x and y values measured around the midpoint of the curve (approx. 50% of the maximum value for x) and x6 is determined by solving the equation with x and y values measured close to one of the endpoints of the curve (100% of the maximum value for x). This subroutine is called from readbsn.f90 and readplant.f90

Parameters

in	*x1*	value for x in the above equation for first datapoint, x1 should be close to 0.5 (the midpoint of the curve)
in	*x2*	value for x in the above equation for second datapoint, x2 should be close to 0.0 or 1.0
in	*x3*	value for y in the above equation corresponding to x1
in	*x4*	value for y in the above equation corresponding to x2
out	*x5*	1st shape parameter for S curve equation characterizing the midpoint of the curve
out	*x6*	2nd shape parameter for S curve equation characterizing the regions close to the endpoints of the curve

7.3 aunif.f90 File Reference

This function generates random numbers ranging from 0.0 to 1.0.

Functions/Subroutines

- real ∗8 function **aunif** (x1)

7.3.1 Detailed Description

This function generates random numbers ranging from 0.0 to 1.0.

Author

modified by Javier Burguete

Parameters

x1	random number generator seed (integer) where $0 < x1 < 2147483647$

Returns

random number ranging from 0.0 to 1.0

In the process of calculating the random number, the seed (x1) is set to a new value. This function implements the prime-modulus generator

$$xi = 16807\, xi \bmod \left(2^{31} - 1\right)$$

using code which ensures that no intermediate result uses more than 31 bits. The theory behind the code is summarized in [1]

7.4 caps.f90 File Reference

this subroutine reads the input and output names given in file.cio and converts all capital letters to lowercase letters.

Functions/Subroutines

- subroutine **caps** (file_name)

7.4.1 Detailed Description

this subroutine reads the input and output names given in file.cio and converts all capital letters to lowercase letters.

Author

modified by Javier Burguete

Parameters

file_name	dummy argument, file name character string

7.5 gcycl.f90 File Reference

This subroutine initializes the random number seeds. If the user desires a different set of random numbers for each simulation run, the random number generator is used to reset the values of the seeds.

Functions/Subroutines

- subroutine **gcycl**

7.5.1 Detailed Description

This subroutine initializes the random number seeds. If the user desires a different set of random numbers for each simulation run, the random number generator is used to reset the values of the seeds.

Author

modified by Javier Burguete

7.6 getallo.f90 File Reference

This subroutine calculates the number of HRUs, subbasins, etc. in the simulation. These values are used to allocate array sizes.

Functions/Subroutines

- subroutine **getallo**

7.6.1 Detailed Description

This subroutine calculates the number of HRUs, subbasins, etc. in the simulation. These values are used to allocate array sizes.

Author

modified by Javier Burguete

7.7 jdt.f90 File Reference

Functions/Subroutines

- integer function jdt (numdays, i, m)

  this function computes the julian date given the month and the day of the month

7.7.1 Detailed Description

file containing the function jdt

Author

modified by Javier Burguete

7.7.2 Function/Subroutine Documentation

7.7.2.1 jdt()

```
integer function jdt (
            integer, dimension (13), intent(in) numdays,
            integer, intent(in) i,
            integer, intent(in) m )
```

this function computes the julian date given the month and the day of the month

Parameters

in	*numdays*	julian date for last day of preceding month (where the array location is the number of the month). The dates are for leap years (numdays=ndays) (julian date)
in	*i*	day
in	*m*	month

7.8 main.f90 File Reference

Functions/Subroutines

- program main

  this is the main program that reads input, calls the main simulation model, and writes output.

7.8.1 Detailed Description

file containing the main program that reads input, calls the main simulation model, and writes output.

Author

modified by Javier Burguete Tolosa

7.9 modparm.f90 File Reference

Data Types

- interface parm::atri
- interface parm::aunif
- interface parm::dstn1
- interface parm::ee
- interface parm::expo
- interface parm::fcgd
- interface parm::qman
- interface parm::regres
- interface parm::tair
- interface parm::theta
- interface parm::ascrv
- interface parm::HQDAV
- interface parm::layersplit
- interface parm::ndenit
- interface parm::rsedaa
- interface parm::vbl

Modules

- module parm

  main module containing the global variables

Variables

- integer, parameter parm::mvaro = 33

  max number of variables routed through the reach
- integer, parameter parm::mhruo = 79

  max number of variables in output.hru
- integer, parameter parm::mrcho = 62

  max number of variables in reach file
- integer, parameter parm::msubo = 24

  max number of variables in output.sub
- integer, parameter parm::mstdo = 113

  max number of variables summarized in output.std
- integer, parameter **parm::motot** = 600
- integer **parm::icalen**
- real ∗8 parm::prf_bsn

  Basinwide peak rate adjustment factor for sediment routing in the channel. Allows impact of peak flow rate on sediment routing and channel reshaping to be taken into account.
- real ∗8 **parm::co2_x2**
- real ∗8 **parm::co2_x**
- real ∗8, dimension(:), allocatable **parm::alph_e**
- real ∗8, dimension(:), allocatable parm::cdn

  denitrification exponential rate coefficient
- real ∗8, dimension(:), allocatable parm::nperco

  nitrate percolation coefficient (0-1)
  0:concentration of nitrate in surface runoff is zero
  1:percolate has same concentration of nitrate as surface runoff
- real ∗8, dimension(:), allocatable parm::surlag

  Surface runoff lag time. This parameter is needed in subbasins where the time of concentration is greater than 1 day. SURLAG is used to create a "storage" for surface runoff to allow the runoff to take longer than 1 day to reach the subbasin outlet (days)
- real ∗8, dimension(:), allocatable **parm::co_p**
- real ∗8, dimension(:), allocatable parm::cmn

  rate factor for humus mineralization on active organic N
- real ∗8, dimension(:), allocatable parm::phoskd

  Phosphorus soil partitioning coefficient. Ratio of soluble phosphorus in surface layer to soluble phosphorus in runoff.
- real ∗8, dimension(:), allocatable parm::psp

  Phosphorus availibility index. The fraction of fertilizer P remaining in labile pool after initial rapid phase of P sorption.
- real ∗8, dimension(:), allocatable parm::sdnco

  denitrification threshold: fraction of field capacity triggering denitrification
- real ∗8 parm::r2adj_bsn

  basinwide retention parameter adjustment factor (greater than 1)
- real ∗8 **parm::yield**
- real ∗8 **parm::burn_frlb**
- real ∗8 **parm::pst_kg**
- real ∗8 **parm::yieldgrn**
- real ∗8 **parm::yieldbms**
- real ∗8 **parm::yieldtbr**
- real ∗8 **parm::yieldn**
- real ∗8 **parm::yieldp**
- real ∗8 **parm::hi_bms**
- real ∗8 **parm::hi_rsd**
- real ∗8 **parm::yieldrsd**
- real ∗8, dimension(:), allocatable **parm::l_k1**

- real ∗8, dimension(:), allocatable **parm::l_k2**
- real ∗8, dimension(:), allocatable **parm::l_lambda**
- real ∗8, dimension(:), allocatable **parm::l_beta**
- real ∗8, dimension(:), allocatable **parm::l_gama**
- real ∗8, dimension(:), allocatable **parm::l_harea**
- real ∗8, dimension(:), allocatable **parm::l_vleng**
- real ∗8, dimension(:), allocatable **parm::l_vslope**
- real ∗8, dimension(:), allocatable **parm::l_ktc**
- real ∗8, dimension(:), allocatable **parm::biofilm_mumax**
- real ∗8, dimension(:), allocatable **parm::biofilm_kinv**
- real ∗8, dimension(:), allocatable **parm::biofilm_klw**
- real ∗8, dimension(:), allocatable **parm::biofilm_kla**
- real ∗8, dimension(:), allocatable **parm::biofilm_cdet**
- real ∗8, dimension(:), allocatable **parm::biofilm_bm**
- real ∗8, dimension(:,:), allocatable **parm::hru_rufr**
- real ∗8, dimension(:,:), allocatable **parm::daru_km**
- real ∗8, dimension(:,:), allocatable **parm::ru_k**
- real ∗8, dimension(:,:), allocatable **parm::ru_c**
- real ∗8, dimension(:,:), allocatable **parm::ru_eiq**
- real ∗8, dimension(:,:), allocatable **parm::ru_ovsl**
- real ∗8, dimension(:,:), allocatable **parm::ru_a**
- real ∗8, dimension(:,:), allocatable **parm::ru_ovs**
- real ∗8, dimension(:,:), allocatable **parm::ru_ktc**
- real ∗8, dimension(:), allocatable **parm::gwq_ru**
- real ∗8, dimension(:), allocatable **parm::qdayout**
- integer, dimension(:), allocatable **parm::ils2**
- integer, dimension(:), allocatable **parm::ils2flag**
- integer **parm::iru**
- integer **parm::mru**
- integer **parm::irch**
- integer **parm::isub**
- integer **parm::idum**
- integer **parm::mhyd_bsn**
- integer **parm::ipest**
- integer **parm::ils_nofig**
- integer **parm::mhru1**
- integer, dimension(:), allocatable **parm::mhyd1**
- integer, dimension(:), allocatable **parm::irtun**
- real ∗8 **parm::wshd_sepno3**
- real ∗8 **parm::wshd_sepnh3**
- real ∗8 **parm::wshd_seporgn**
- real ∗8 **parm::wshd_sepfon**
- real ∗8 **parm::wshd_seporgp**
- real ∗8 **parm::wshd_sepfop**
- real ∗8 **parm::wshd_sepsolp**
- real ∗8 **parm::wshd_sepbod**
- real ∗8 **parm::wshd_sepmm**
- integer, dimension(:), allocatable **parm::isep_hru**
- real ∗8 parm::fixco

  nitrogen fixation coefficient
- real ∗8 parm::nfixmx

  maximum daily n-fixation (kg/ha)
- real ∗8 parm::res_stlr_co

  reservoir sediment settling coefficient

- real ∗8 parm::rsd_covco

  residue cover factor for computing frac of cover
- real ∗8 parm::vcrit

  critical velocity
- real ∗8 **parm::wshd_sw**
- real ∗8 **parm::wshd_snob**
- real ∗8 **parm::wshd_pndfr**
- real ∗8 **parm::wshd_pndv**
- real ∗8 **parm::wshd_pndsed**
- real ∗8 parm::percop

  pesticide percolation coefficient (0-1)
  0: concentration of pesticide in surface runoff is zero
  1: percolate has same concentration of pesticide as surface runoff
- real ∗8 **parm::wshd_wetfr**
- real ∗8 **parm::wshd_resfr**
- real ∗8 **parm::wshd_resha**
- real ∗8 **parm::wshd_pndha**
- real ∗8 **parm::wshd_fminp**
- real ∗8 **parm::wshd_ftotn**
- real ∗8 **parm::wshd_fnh3**
- real ∗8 **parm::wshd_fno3**
- real ∗8 **parm::wshd_forgn**
- real ∗8 **parm::wshd_forgp**
- real ∗8 **parm::wshd_ftotp**
- real ∗8 **parm::wshd_yldn**
- real ∗8 **parm::wshd_yldp**
- real ∗8 **parm::wshd_fixn**
- real ∗8 **parm::wshd_pup**
- real ∗8 **parm::wshd_wstrs**
- real ∗8 **parm::wshd_nstrs**
- real ∗8 **parm::wshd_pstrs**
- real ∗8 **parm::wshd_tstrs**
- real ∗8 **parm::wshd_astrs**
- real ∗8 parm::ffcb

  initial soil water content expressed as a fraction of field capacity
- real ∗8 **parm::wshd_hmn**
- real ∗8 **parm::wshd_rwn**
- real ∗8 **parm::wshd_hmp**
- real ∗8 **parm::wshd_rmn**
- real ∗8 **parm::wshd_dnit**
- real ∗8 parm::wdpq

  die-off factor for persistent bacteria in soil solution (1/day)
- real ∗8 **parm::wshd_rmp**
- real ∗8 **parm::wshd_voln**
- real ∗8 **parm::wshd_nitn**
- real ∗8 **parm::wshd_pas**
- real ∗8 **parm::wshd_pal**
- real ∗8 parm::wof_p

  wash off fraction for persistent bacteria on foliage during a rainfall event
- real ∗8 **parm::wshd_plch**
- real ∗8 **parm::wshd_raino3**
- real ∗8 **parm::ressedc**
- real ∗8 **parm::basno3f**
- real ∗8 **parm::basorgnf**

- real ∗8 **parm::wshd_pinlet**
- real ∗8 **parm::wshd_ptile**
- real ∗8 parm::sftmp

  Snowfall temperature (deg C)
- real ∗8 parm::smfmn

  Minimum melt rate for snow during year (Dec. 21) where deg C refers to the air temperature. (mm/deg C/day)
- real ∗8 parm::smfmx

  Maximum melt rate for snow during year (June 21) where deg C refers to the air temperature. SMFMX and SM↩ FMN allow the rate of snow melt to vary through the year. These parameters are accounting for the impact of soil temperature on snow melt. (mm/deg C/day)
- real ∗8 parm::smtmp

  Snow melt base temperature. Mean air temperature at which snow melt will occur. (deg C)
- real ∗8 parm::wgpq

  growth factor for persistent bacteria in soil solution (1/day)
- real ∗8 **parm::basminpf**
- real ∗8 **parm::basorgpf**
- real ∗8 parm::wdlpq

  die-off factor for less persistent bacteria in soil solution (1/day)
- real ∗8 **parm::wshd_resv**
- real ∗8 **parm::wshd_ressed**
- real ∗8 **parm::basno3i**
- real ∗8 **parm::basorgni**
- real ∗8 **parm::basminpi**
- real ∗8 parm::wdps

  die-off factor for persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 parm::wglpq

  growth factor for less persistent bacteria in soil solution (1/day)
- real ∗8 **parm::basorgpi**
- real ∗8 **parm::peakr**
- real ∗8 **parm::pndsedin**
- real ∗8 **parm::sw_excess**
- real ∗8 **parm::albday**
- real ∗8 parm::timp

  Snow pack temperature lag factor (0-1)
  1 = no lag (snow pack temp=current day air temp) as the lag factor goes to zero, the snow pack's temperature will be less influenced by the current day's air temperature.
- real ∗8 **parm::wtabelo**
- real ∗8 **parm::tilep**
- real ∗8 **parm::wt_shall**
- real ∗8 **parm::sq_rto**
- real ∗8 **parm::tloss**
- real ∗8 **parm::inflpcp**
- real ∗8 **parm::snomlt**
- real ∗8 **parm::snofall**
- real ∗8 **parm::fixn**
- real ∗8 **parm::qtile**
- real ∗8 **parm::crk**
- real ∗8 **parm::latlyr**
- real ∗8 **parm::pndloss**
- real ∗8 **parm::wetloss**
- real ∗8 **parm::potloss**
- real ∗8 **parm::lpndloss**
- real ∗8 **parm::lwetloss**
- real ∗8 **parm::sedrch**

- real ∗8 **parm::fertn**
- real ∗8 **parm::sol_rd**
- real ∗8 **parm::cfertn**
- real ∗8 **parm::cfertp**
- real ∗8 **parm::sepday**
- real ∗8 **parm::bioday**
- real ∗8 **parm::sepcrk**
- real ∗8 **parm::sepcrktot**
- real ∗8 **parm::fertno3**
- real ∗8 **parm::fertnh3**
- real ∗8 **parm::fertorgn**
- real ∗8 **parm::fertsolp**
- real ∗8 **parm::fertorgp**
- real ∗8 parm::wgps

  growth factor for persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 **parm::fertp**
- real ∗8 **parm::grazn**
- real ∗8 **parm::grazp**
- real ∗8 **parm::soxy**
- real ∗8 **parm::qdfr**
- real ∗8 **parm::sdti**
- real ∗8 **parm::rtwtr**
- real ∗8 **parm::ressa**
- real ∗8 parm::wdlps

  die-off factor for less persistent bacteria absorbed to soil particles (1/day)
- real ∗8 parm::wglps

  growth factor for less persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 parm::da_km

  area of the watershed in square kilometers (km^ 2)
- real ∗8 **parm::rttime**
- real ∗8 **parm::rchdep**
- real ∗8 **parm::rtevp**
- real ∗8 **parm::rttlc**
- real ∗8 **parm::resflwi**
- real ∗8 parm::wdprch

  die-off factor for persistent bacteria in streams (1/day)
- real ∗8 **parm::resflwo**
- real ∗8 **parm::respcp**
- real ∗8 **parm::resev**
- real ∗8 **parm::ressep**
- real ∗8 **parm::ressedi**
- real ∗8 **parm::ressedo**
- real ∗8 **parm::dtot**
- real ∗8 parm::pperco_bsn

  phosphorus percolation coefficient. Ratio of soluble phosphorus in surface to soluble phosphorus in percolate
- real ∗8 parm::nperco_bsn

  basin nitrate percolation coefficient (0-1)
  0:concentration of nitrate in surface runoff is zero
  1:percolate has same concentration of nitrate as surface runoff
- real ∗8 parm::rsdco

  residue decomposition coefficient. The fraction of residue which will decompose in a day assuming optimal moisture, temperature, C:N ratio, and C:P ratio
- real ∗8 **parm::phoskd_bsn**
- real ∗8 **parm::voltot**

- real ∗8 parm::msk_x

  weighting factor controling relative importance of inflow rate and outflow rate in determining storage on reach
- real ∗8 **parm::volcrmin**
- real ∗8 parm::bactkdq

  bacteria soil partitioning coefficient. Ratio of solution bacteria in surface layer to solution bacteria in runoff soluble and sorbed phase in surface runoff.
- real ∗8 parm::wdpf

  die-off factor for persistent bacteria on foliage (1/day)
- real ∗8 **parm::uno3d**
- real ∗8 **parm::canev**
- real ∗8 **parm::usle**
- real ∗8 **parm::rcn**
- real ∗8 **parm::surlag_bsn**
- real ∗8 **parm::precipday**
- real ∗8 parm::thbact

  temperature adjustment factor for bacteria die-off/growth
- real ∗8 parm::wlpq20

  overall rate change for less persistent bacteria in soil solution (1/day)
- real ∗8 parm::wlps20

  overall rate change for less persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 parm::wpq20

  overall rate change for persistent bacteria in soil solution (1/day)
- real ∗8 parm::wps20

  overall rate change for persistent bacteria adsorbed to soil particles (1/day)
- real ∗8 **parm::bactrop**
- real ∗8 **parm::bactsedp**
- real ∗8 parm::wgpf

  growth factor for persistent bacteria on foliage (1/day)
- real ∗8 **parm::bactlchp**
- real ∗8 **parm::bactlchlp**
- real ∗8 **parm::enratio**
- real ∗8 **parm::wetpcp**
- real ∗8 **parm::pndpcp**
- real ∗8 **parm::wetsep**
- real ∗8 **parm::pndsep**
- real ∗8 **parm::wetev**
- real ∗8 **parm::pndev**
- real ∗8 **parm::pndsedo**
- real ∗8 **parm::wetsedo**
- real ∗8 **parm::pndflwi**
- real ∗8 **parm::wetflwi**
- real ∗8 **parm::pndflwo**
- real ∗8 **parm::wetflwo**
- real ∗8 **parm::wetsedi**
- real ∗8 **parm::da_ha**
- real ∗8 **parm::vpd**
- real ∗8 parm::evlai

  leaf area index at which no evaporation occurs. This variable is used in ponded HRUs where evaporation from the water surface is restricted by the plant canopy cover. Evaporation from the water surface equals potential ET when LAI = 0 and decreased linearly to O when LAI = EVLAI
- real ∗8 parm::evrch

  Reach evaporation adjustment factor. Evaporation from the reach is multiplied by EVRCH. This variable was created to limit the evaporation predicted in arid regions.

- real ∗8 parm::wdlpf

  die-off factor for less persistent bacteria on foliage (1/day)
- real ∗8 **parm::bactrolp**
- real ∗8 **parm::bactsedlp**
- real ∗8 **parm::pet_day**
- real ∗8 **parm::ep_day**
- real ∗8 parm::adj_pkr

  peak rate adjustment factor in the subbasin. Used in the MUSLE equation to account for impact of peak flow on erosion.
- real ∗8 parm::n_updis

  nitrogen uptake distribution parameter. This parameter controls the amount of nitrogen removed from the different soil layer layers by the plant. In particular, this parameter allows the amount of nitrogen removed from the surface layer via plant uptake to be controlled. While the relationship between UBN and N removed from the surface layer is affected by the depth of the soil profile, in general, as UBN increases the amount of N removed from the surface layer relative to the amount removed from the entire profile increases
- real ∗8 parm::nactfr

  nitrogen active pool fraction. The fraction of organic nitrogen in the active pool.
- real ∗8 parm::p_updis

  phosphorus uptake distribution parameter This parameter controls the amount of phosphorus removed from the different soil layers by the plant. In particular, this parameter allows the amount of phosphorus removed from the surface layer via plant uptake to be controlled. While the relationship between UBP and P uptake from the surface layer is affected by the depth of the soil profile, in general, as UBP increases the amount of P removed from the surface layer relative to the amount removed from the entire profile increases
- real ∗8 **parm::snoev**
- real ∗8 **parm::sno3up**
- real ∗8 **parm::reactw**
- real ∗8 **parm::sdiegropq**
- real ∗8 **parm::sdiegrolpq**
- real ∗8 **parm::sdiegrops**
- real ∗8 **parm::sdiegrolps**
- real ∗8 **parm::es_day**
- real ∗8 parm::wof_lp

  wash off fraction for less persistent bacteria on foliage during a rainfall event
- real ∗8 **parm::sbactrop**
- real ∗8 **parm::sbactrolp**
- real ∗8 **parm::sbactsedp**
- real ∗8 **parm::sbactsedlp**
- real ∗8 **parm::ep_max**
- real ∗8 **parm::sbactlchp**
- real ∗8 **parm::sbactlchlp**
- real ∗8 **parm::psp_bsn**
- real ∗8 **parm::rchwtr**
- real ∗8 **parm::resuspst**
- real ∗8 **parm::setlpst**
- real ∗8 **parm::bsprev**
- real ∗8 **parm::bssprev**
- real ∗8 **parm::spadyo**
- real ∗8 **parm::spadyev**
- real ∗8 **parm::spadysp**
- real ∗8 **parm::spadyrfv**
- real ∗8 **parm::spadyosp**
- real ∗8 **parm::qday**
- real ∗8 **parm::usle_ei**
- real ∗8 **parm::al5**
- real ∗8 **parm::pndsedc**

- real ∗8 **parm::no3pcp**
- real ∗8 **parm::rcharea**
- real ∗8 **parm::volatpst**
- real ∗8 parm::ubw

  water uptake distribution parameter. This parameter controls the amount of water removed from the different soil layers by the plant. In particular, this parameter allows the amount of water removed from the surface layer via plant uptake to be controlled. While the relationship between UBW and H2O removed from the surface layer is affected by the depth of the soil profile, in general, as UBW increases the amount of water removed from the surface layer relative to the amount removed from the entire profile increases
- real ∗8 parm::uobn

  nitrogen uptake normalization parameter. This variable normalizes the nitrogen uptake so that the model can easily verify that upake from the different soil layers sums to 1.0
- real ∗8 parm::uobp

  phosphorus uptake normalization parameter. This variable normalizes the phosphorus uptake so that the model can easily verify that uptake from the different soil layers sums to 1.0
- real ∗8 parm::uobw

  water uptake normalization parameter. This variable normalizes the water uptake so that the model can easily verify that uptake from the different soil layers sums to 1.0
- real ∗8 parm::wglpf

  growth factor for less persistent bacteria on foliage (1/day)
- real ∗8 **parm::wetsedc**
- real ∗8 **parm::respesti**
- real ∗8 parm::rcor

  correction coefficient for generated rainfall to ensure that the annual means for generated and observed values are comparable (needed only if IDIST=1)
- real ∗8 parm::rexp

  value of exponent for mixed exponential rainfall distribution (needed only if IDIST=1)
- real ∗8 parm::snocov1

  1st shape parameter for snow cover equation. This parameter is determined by solving the equation for 50% snow cover
- real ∗8 parm::snocov2

  2nd shape parameter for snow cover equation. This parameter is determined by solving the equation for 95% snow cover
- real ∗8 parm::snocovmx

  Minimum snow water content that corresponds to 100% snow cover. If the snow water content is less than SNOC↩ OVMX, then a certain percentage of the ground will be bare (mm H2O)
- real ∗8 **parm::lyrtile**
- real ∗8 **parm::lyrtilex**
- real ∗8 parm::sno50cov

  Fraction of SNOCOVMX that corresponds to 50% snow cover. SWAT assumes a nonlinear relationship between snow water and snow cover.
- real ∗8 parm::ai0

  ratio of chlorophyll-a to algal biomass (ug chla/mg alg)
- real ∗8 parm::ai1

  fraction of algal biomass that is nitrogen (mg N/mg alg)
- real ∗8 parm::ai2

  fraction of algal biomass that is phosphorus (mg P/mg alg)
- real ∗8 parm::ai3

  the rate of oxygen production per unit of algal photosynthesis (mg O2/mg alg)
- real ∗8 parm::ai4

  the rate of oxygen uptake per unit of algae respiration (mg O2/mg alg)
- real ∗8 parm::ai5

  the rate of oxygen uptake per unit of NH3 nitrogen oxidation (mg O2/mg N)
- real ∗8 parm::ai6

the rate of oxygen uptake per unit of NO2 nitrogen oxidation (mg O2/mg N)

- real ∗8 parm::rhoq

  algal respiration rate (1/day or 1/hr)
- real ∗8 parm::tfact

  fraction of solar radiation computed in the temperature heat balance that is photosynthetically active
- real ∗8 parm::k_l

  half-saturation coefficient for light (MJ/(m2∗hr))
- real ∗8 parm::k_n

  michaelis-menton half-saturation constant for nitrogen (mg N/L)
- real ∗8 parm::k_p

  michaelis-menton half saturation constant for phosphorus (mg P/L)
- real ∗8 parm::lambda0

  non-algal portion of the light extinction coefficient (1/m)
- real ∗8 parm::lambda1

  linear algal self-shading coefficient (1/(m∗ug chla/L))
- real ∗8 parm::lambda2

  nonlinear algal self-shading coefficient ((1/m)(ug chla/L)∗∗(-2/3))
- real ∗8 parm::mumax

  maximum specific algal growth rate (1/day or 1/hr)
- real ∗8 parm::p_n

  algal preference factor for ammonia
- real ∗8 **parm::rnum1**
- real ∗8 **parm::autop**
- real ∗8 **parm::auton**
- real ∗8 **parm::etday**
- real ∗8 **parm::hmntl**
- real ∗8 **parm::rwntl**
- real ∗8 **parm::hmptl**
- real ∗8 **parm::rmn2tl**
- real ∗8 **parm::rmptl**
- real ∗8 **parm::wdntl**
- real ∗8 **parm::cmn_bsn**
- real ∗8 **parm::rmp1tl**
- real ∗8 **parm::roctl**
- real ∗8 **parm::gwseep**
- real ∗8 **parm::revapday**
- real ∗8 **parm::reswtr**
- real ∗8 parm::wdlprch

  die-off factor for less persistent bacteria in streams (1/day)
- real ∗8 parm::wdpres

  die-off factor for persistent bacteria in reservoirs (1/day)
- real ∗8 **parm::bury**
- real ∗8 **parm::difus**
- real ∗8 **parm::reactb**
- real ∗8 **parm::solpesto**
- real ∗8 **parm::petmeas**
- real ∗8 parm::wdlpres

  die-off factor for less persistent bacteria in reservoirs (1/day)
- real ∗8 **parm::sorpesto**
- real ∗8 **parm::spcon_bsn**
- real ∗8 **parm::spexp_bsn**
- real ∗8 **parm::solpesti**

- real ∗8 **parm::sorpesti**
- real ∗8 parm::msk_co1

  calibration coefficient to control impact of the storage time constant for the reach at bankfull depth (phi(10,:) upon the storage time constant for the reach used in the Muskingum flow method
- real ∗8 parm::msk_co2

  calibration coefficient to control impact of the storage time constant for the reach at 0.1 bankfull depth (phi(13,:) upon the storage time constant for the reach used in the Muskingum flow method
- real ∗8 **parm::snoprev**
- real ∗8 **parm::swprev**
- real ∗8 **parm::shallstp**
- real ∗8 **parm::deepstp**
- real ∗8 **parm::ressolpo**
- real ∗8 **parm::resorgno**
- real ∗8 **parm::resorgpo**
- real ∗8 **parm::resno3o**
- real ∗8 **parm::reschlao**
- real ∗8 **parm::resno2o**
- real ∗8 **parm::resnh3o**
- real ∗8 **parm::qdbank**
- real ∗8 **parm::potpcpmm**
- real ∗8 **parm::potevmm**
- real ∗8 **parm::potsepmm**
- real ∗8 **parm::potflwo**
- real ∗8 parm::bactminlp

  Threshold detection level for less persistent bacteria. When bacteria levels drop to this amount the model considers bacteria in the soil to be insignificant and sets the levels to zero (cfu/m^ 2)
- real ∗8 parm::bactminp

  Threshold detection level for persistent bacteria. When bacteria levels drop to this amount the model considers bacteria in the soil to be insignificant and sets the levels to zero (cfu/m^ 2)
- real ∗8 parm::trnsrch

  fraction of transmission losses from main channel that enter deep aquifer
- real ∗8 parm::wp20p_plt

  overall rate change for persistent bacteria on foliage (1/day)
- real ∗8 **parm::potsedo**
- real ∗8 **parm::pest_sol**
- real ∗8 parm::bact_swf

  fraction of manure containing active colony forming units (cfu)
- real ∗8 parm::bactmx

  bacteria percolation coefficient. Ratio of solution bacteria in surface layer to solution bacteria in percolate
- real ∗8 parm::cncoef

  plant ET curve number coefficient
- real ∗8 parm::wp20lp_plt

  overall rate change for less persistent bacteria on foliage (1/day)
- real ∗8 **parm::cdn_bsn**
- real ∗8 **parm::sdnco_bsn**
- real ∗8 **parm::bactmin**
- real ∗8 parm::cn_froz

  drainge coefficient (mm day -1)
- real ∗8 parm::dorm_hr

  time threshold used to define dormant (hours)
- real ∗8 parm::smxco

  adjustment factor for max curve number s factor (0-1)
- real ∗8 parm::tb_adj

adjustment factor for subdaily unit hydrograph basetime

- real ∗8 parm::chla_subco

  regional adjustment on sub chla_a loading (fraction)
- real ∗8 parm::depimp_bsn

  depth to impervious layer. Used to model perched water tables in all HRUs in watershed (mm)
- real ∗8 parm::ddrain_bsn

  depth to the sub-surface drain (mm)
- real ∗8 parm::tdrain_bsn

  time to drain soil to field capacity (hours)
- real ∗8 **parm::gdrain_bsn**
- real ∗8 **parm::rch_san**
- real ∗8 **parm::rch_sil**
- real ∗8 **parm::rch_cla**
- real ∗8 **parm::rch_sag**
- real ∗8 **parm::rch_lag**
- real ∗8 **parm::rch_gra**
- real ∗8 parm::hlife_ngw_bsn

  Half-life of nitrogen in groundwater? (days)
- real ∗8 **parm::ch_opco_bsn**
- real ∗8 **parm::ch_onco_bsn**
- real ∗8 parm::decr_min

  Minimum daily residue decay.
- real ∗8 parm::rcn_sub_bsn

  Concentration of nitrogen in the rainfall (mg/kg)
- real ∗8 **parm::bc1_bsn**
- real ∗8 **parm::bc2_bsn**
- real ∗8 **parm::bc3_bsn**
- real ∗8 **parm::bc4_bsn**
- real ∗8 **parm::anion_excl_bsn**
- real ∗8, dimension(:), allocatable **parm::wat_tbl**
- real ∗8, dimension(:), allocatable **parm::sol_swpwt**
- real ∗8, dimension(:,:), allocatable **parm::vwt**
- real ∗8 parm::re_bsn

  Effective radius of drains (range 3.0 - 40.0) (mm)
- real ∗8 parm::sdrain_bsn

  Distance bewtween two drain or tile tubes (range 7600.0 - 30000.0) (mm)
- real ∗8 **parm::sstmaxd_bsn**
- real ∗8 parm::drain_co_bsn

  Drainage coeffcient (range 10.0 - 51.0) (mm-day-1)
- real ∗8 parm::latksatf_bsn

  Multiplication factor to determine lateral ksat from SWAT ksat input value for HRU (range 0.01 - 4.0)
- real ∗8 parm::pc_bsn

  Pump capacity (def val = 1.042 mm h-1 or 25 mm day-1) (mm h-1)
- integer **parm::i_subhw**
- integer **parm::imgt**
- integer **parm::idlast**
- integer **parm::iwtr**
- integer **parm::ifrttyp**
- integer **parm::mo_atmo**
- integer **parm::mo_atmo1**
- integer **parm::ifirstatmo**
- integer **parm::iyr_atmo**
- integer **parm::iyr_atmo1**

- integer **parm::matmo**
- integer parm::mch

  maximum number of channels
- integer parm::mcr

  maximum number of crops grown per year
- integer parm::mcrdb

  maximum number of crops/landcover in database file (crop.dat)
- integer parm::mfcst

  maximum number of forecast stations
- integer parm::mfdb

  max number of fertilizers in fert.dat
- integer parm::mhru

  maximum number of HRUs in watershed
- integer parm::mhyd

  maximum number of hydrograph nodes
- integer parm::mpdb

  max number of pesticides in pest.dat
- integer parm::mrg

  max number of rainfall/temp gages
- integer parm::mcut

  maximum number of cuttings per year
- integer parm::mgr

  maximum number of grazings per year
- integer parm::mnr

  max number of years of rotation
- integer parm::myr

  max number of years of simulation
- integer parm::isubwq

  subbasin water quality code
  0 do not calculate algae/CBOD 1 calculate algae/CBOD drainmod tile equations
- integer **parm::ffcst**
- integer parm::isproj

  special project code: 1 test rewind (run simulation twice)
- integer parm::nbyr

  number of calendar years simulated
- integer parm::irte

  water routing method:
  0 variable storage method
  1 Muskingum method
- integer parm::nrch

  number of reaches in watershed (none)
- integer parm::nres

  number of reservoirs in watershed (none)
- integer **parm::nhru**
- integer **parm::mo**
- integer **parm::immo**
- integer **parm::i_mo**
- integer parm::wndsim

  wind speed input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin

- integer parm::ihru

  HRU number (none)
- integer **parm::icode**
- integer **parm::ihout**
- integer **parm::inum1**
- integer **parm::inum2**
- integer **parm::inum3**
- integer **parm::inum4**
- integer parm::icfac

  icfac = 0 for C-factor calculation using Cmin (as described in manual)
  = 1 for new C-factor calculation from RUSLE (no minimum needed)
- integer **parm::inum5**
- integer **parm::inum6**
- integer **parm::inum7**
- integer **parm::inum8**
- integer parm::mrech

  maximum number of rechour files
- integer parm::nrgage

  number of raingage files
- integer parm::nrgfil

  number of rain gages per file
- integer parm::nrtot

  total number of rain gages
- integer parm::ntgage

  number of temperature gage files
- integer parm::ntgfil

  number of temperature gages per file
- integer parm::nttot

  total number of temperature gages
- integer parm::tmpsim

  temperature input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin
- integer parm::icrk

  crack flow code
  1: compute flow in cracks
- integer parm::irtpest

  number of pesticide to be routed through the watershed
- integer parm::igropt

  Qual2E option for calculating the local specific growth rate of algae
  1: multiplicative.
- integer parm::lao

  Qual2E light averaging option. Qual2E defines four light averaging options. The only option currently available in SWAT is #2.
- integer **parm::npmx**
- integer **parm::curyr**
- integer **parm::iihru**
- integer parm::itdrn

  tile drainage equations flag/code
  1 simulate tile flow using subroutine drains(wt_shall)
  0 simulate tile flow using subroutine origtile(wt_shall,d)
- integer parm::iwtdn

water table depth algorithms flag/code
1 simulate wt_shall using subroutine new water table depth routine
0 simulate wt_shall using subroutine original water table depth routine

- integer parm::ismax

  maximum depressional storage selection flag/code
  0 = static depressional storage
  1 = dynamic storage based on tillage and cumulative rainfall
- integer parm::iroutunit

  not being implemented in this version drainmod tile equations
- integer **parm::ires_nut**
- integer parm::iclb

  auto-calibration flag
- integer parm::mrecc

  maximum number of reccnst files
- integer parm::mrecd

  maximum number of recday files
- integer parm::mrecm

  maximum number of recmon files
- integer parm::mtil

  max number of tillage types in till.dat
- integer parm::mudb

  maximum number of urban land types in urban.dat
- integer parm::idist

  rainfall distribution code
  0 for skewed normal dist
  1 for mixed exponential distribution
- integer parm::mrecy

  maximum number of recyear files
- integer parm::nyskip

  number of years to not print output
- integer parm::slrsim

  solar radiation input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin
- integer parm::ideg

  channel degredation code
  1: compute channel degredation (downcutting and widening)
- integer parm::ievent

  rainfall/runoff code
  0 daily rainfall/curve number technique 1 sub-daily rainfall/Green&Ampt/hourly routing 3 sub-daily rainfall/Green&Ampt/hourly routing
- integer parm::ipet

  code for potential ET method
  0 Priestley-Taylor method
  1 Penman/Monteith method
  2 Hargreaves method
  3 read in daily potential ET data
- integer **parm::iopera**
- integer parm::idaf

  beginning day of simulation (julian date)
- integer parm::idal

  ending day of simulation (julian date)
- integer parm::rhsim

relative humidity input code
1 measured data read for each subbasin
2 data simulated for each subbasin

- integer **parm::id1**
- integer **parm::leapyr**
- integer **parm::mo_chk**
- integer parm::nhtot

  number of relative humidity records in file
- integer parm::nstot

  number of solar radiation records in file
- integer parm::nwtot

  number of wind speed records in file
- integer **parm::ifirsts**
- integer **parm::ifirsth**
- integer **parm::ifirstw**
- integer **parm::icst**
- integer parm::ilog

  streamflow print code
- integer parm::itotr

  number of output variables printed (output.rch)
- integer parm::iyr

  beginning year of simulation (year)
- integer parm::iwq

  stream water quality code
  0 do not model stream water quality
  1 model stream water quality (QUAL2E & pesticide transformations)
- integer parm::i

  forecast region number or subbasin number (none)
- integer **parm::iskip**
- integer **parm::ifirstpet**
- integer parm::iprp

  print code for output.pst file
  0 do not print pesticide output
  1 print pesticide output
- integer parm::itotb

  number of output variables printed (output.sub)
- integer parm::itots

  number of output variables printed (output.hru)
- integer parm::itoth

  number of HRUs printed (output.hru/output.wtr)
- integer parm::pcpsim

  rainfall input code
  1 measured data read for each subbasin
  2 data simulated for each subbasin
- integer **parm::nd_30**
- integer **parm::iops**
- integer **parm::iphr**
- integer **parm::isto**
- integer **parm::isol**
- integer parm::fcstcycles

  number of times forecast period is simulated (using different weather generator seeds each time)
- integer parm::fcstday

  beginning date of forecast period (julian date)

- integer parm::fcstyr

  beginning year of forecast period
- integer parm::iscen

  scenarios counter
- integer parm::subtot

  number of subbasins in watershed (none)
- integer **parm::ogen**
- integer parm::mapp

  maximum number of applications
- integer parm::mlyr

  maximum number of soil layers
- integer parm::mpst

  max number of pesticides used in wshed
- integer parm::mres

  maximum number of reservoirs
- integer parm::msub

  maximum number of subbasins
- integer parm::igen

  random number generator code:
  0: use default numbers
  1: generate new numbers in every simulation
- integer parm::iprint

  print code: 0=monthly, 1=daily, 2=annual
- integer **parm::iida**
- integer parm::icn

  CN method flag (for testing alternative method):
  0 use traditional SWAT method which bases CN on soil moisture
  1 use alternative method which bases CN on plant ET.
- integer parm::ised_det

  max half-hour rainfall fraction calc option:
  0 generate max half-hour rainfall fraction from triangular distribution
  1 use monthly mean max half-hour rainfall fraction
- integer **parm::fcstcnt**
- integer **parm::mtran**
- integer **parm::idtill**
- integer, dimension(100) **parm::ida_lup**
- integer, dimension(100) **parm::iyr_lup**
- integer **parm::no_lup**
- integer **parm::no_up**
- integer **parm::nostep**
- character(len=8) parm::date

  date simulation is performed where leftmost eight characters are set to a value of yyyymmdd, where yyyy is the year, mm is the month and dd is the day
- character(len=10) parm::time

  time simulation is performed where leftmost ten characters are set to a value of hhmmss.sss, where hh is the hour, mm is the minutes and ss.sss is the seconds and milliseconds
- character(len=5) parm::zone

  time difference with respect to Coordinated Universal Time (ie Greenwich Mean Time)
- character(len=80) parm::prog

  SWAT program header string.
- character(len=13) parm::calfile

  name of file containing calibration parameters
- character(len=13) parm::rhfile

relative humidity file name (.hmd)

- character(len=13) parm::slrfile

  solar radiation file name (.slr)
- character(len=13) parm::wndfile

  wind speed file name (.wnd)
- character(len=13) parm::petfile

  potential ET file name (.pet)
- character(len=13) **parm::atmofile**
- character(len=13) **parm::lucfile**
- character(len=13) parm::septdb

  name of septic tank database file (septwq1.dat)
- character(len=13) **parm::dpd_file**
- character(len=13) **parm::wpd_file**
- character(len=13) **parm::rib_file**
- character(len=13) **parm::sfb_file**
- character(len=13) **parm::lid_file**
- integer, dimension(9) parm::idg

  array location of random number seed used for a given process
- integer, dimension(:), allocatable **parm::ifirstr**
- integer, dimension(:), allocatable **parm::ifirsthr**
- integer, dimension(8) parm::values

  values(1): year simulation is performed
  values(2): month simulation is performed
  values(3): day in month simulation is performed
  values(4): time difference with respect to Coordinated Universal Time (ie Greenwich Mean Time)
  values(5): hour simulation is performed
  values(6): minute simulation is performed
  values(7): second simulation is performed
  values(8): millisecond simulation is performed
- integer, dimension(13) parm::ndays

  julian date for last day of preceding month (where the array location is the number of the month) The dates are for leap years (julian date)
- integer, dimension(13) **parm::ndays_noleap**
- integer, dimension(13) **parm::ndays_leap**
- integer **parm::mapex**
- real ∗8, dimension(:), allocatable **parm::flodaya**
- real ∗8, dimension(:), allocatable **parm::seddaya**
- real ∗8, dimension(:), allocatable **parm::orgndaya**
- real ∗8, dimension(:), allocatable **parm::orgpdaya**
- real ∗8, dimension(:), allocatable **parm::no3daya**
- real ∗8, dimension(:), allocatable **parm::minpdaya**
- real ∗8, dimension(:), allocatable parm::hi_targ

  index target of cover defined at planting
- real ∗8, dimension(:), allocatable **parm::bio_targ**
- real ∗8, dimension(:), allocatable **parm::tnyld**
- integer, dimension(:), allocatable **parm::idapa**
- integer, dimension(:), allocatable **parm::iypa**
- integer, dimension(:), allocatable **parm::ifirsta**
- integer, dimension(100) **parm::mo_transb**
- integer, dimension(100) **parm::mo_transe**
- integer, dimension(100) **parm::ih_tran**
- integer **parm::msdb**
- integer **parm::iseptic**
- real ∗8, dimension(:), allocatable **parm::sptqs**

- real ∗8, dimension(:), allocatable **parm::percp**
- real ∗8, dimension(:), allocatable **parm::sptbodconcs**
- real ∗8, dimension(:), allocatable **parm::spttssconcs**
- real ∗8, dimension(:), allocatable **parm::spttnconcs**
- real ∗8, dimension(:), allocatable **parm::sptnh4concs**
- real ∗8, dimension(:), allocatable **parm::sptno3concs**
- real ∗8, dimension(:), allocatable **parm::sptno2concs**
- real ∗8, dimension(:), allocatable **parm::sptorgnconcs**
- real ∗8, dimension(:), allocatable **parm::spttpconcs**
- real ∗8, dimension(:), allocatable **parm::sptminps**
- real ∗8, dimension(:), allocatable **parm::sptorgps**
- real ∗8, dimension(:), allocatable **parm::sptfcolis**
- real ∗8, dimension(:), allocatable **parm::failyr**
- real ∗8, dimension(:), allocatable **parm::qstemm**
- real ∗8, dimension(:), allocatable **parm::bio_amn**
- real ∗8, dimension(:), allocatable **parm::bio_bod**
- real ∗8, dimension(:), allocatable **parm::biom**
- real ∗8, dimension(:), allocatable **parm::rbiom**
- real ∗8, dimension(:), allocatable **parm::fcoli**
- real ∗8, dimension(:), allocatable **parm::bio_ntr**
- real ∗8, dimension(:), allocatable **parm::bz_perc**
- real ∗8, dimension(:), allocatable parm::sep_cap

  number of permanent residents in the hourse (none)
- real ∗8, dimension(:), allocatable **parm::plqm**
- real ∗8, dimension(:), allocatable **parm::bz_area**
- real ∗8, dimension(:), allocatable parm::bz_z

  Depth of biozone layer(mm)
- real ∗8, dimension(:), allocatable parm::bz_thk

  thickness of biozone (mm)
- real ∗8, dimension(:), allocatable parm::bio_bd

  density of biomass (kg/m^ 3) carbon outputs for .hru file
- real ∗8, dimension(:), allocatable **parm::cmup_kgh**
- real ∗8, dimension(:), allocatable **parm::cmtot_kgh**
- real ∗8, dimension(:), allocatable parm::coeff_denitr

  denitrification rate coefficient (none)
- real ∗8, dimension(:), allocatable parm::coeff_bod_dc

  BOD decay rate coefficient (m^ 3/day)
- real ∗8, dimension(:), allocatable parm::coeff_bod_conv

  BOD to live bacteria biomass conversion factor (none)
- real ∗8, dimension(:), allocatable parm::coeff_fc1

  field capacity calibration parameter 1 (none)
- real ∗8, dimension(:), allocatable parm::coeff_fc2

  field capacity calibration parameter 2 (none)
- real ∗8, dimension(:), allocatable parm::coeff_fecal

  fecal coliform bacteria decay rate coefficient (m^ 3/day)
- real ∗8, dimension(:), allocatable parm::coeff_mrt

  mortality rate coefficient (none)
- real ∗8, dimension(:), allocatable parm::coeff_nitr

  nitrification rate coefficient (none)
- real ∗8, dimension(:), allocatable parm::coeff_plq

  conversion factor for plaque from TDS (none)
- real ∗8, dimension(:), allocatable parm::coeff_rsp

respiration rate coefficient (none)

- real ∗8, dimension(:), allocatable parm::coeff_slg1

slough-off calibration parameter (none)

- real ∗8, dimension(:), allocatable parm::coeff_slg2

slough-off calibration parameter (none)

- real ∗8, dimension(:), allocatable **parm::coeff_pdistrb**
- real ∗8, dimension(:), allocatable **parm::coeff_solpslp**
- real ∗8, dimension(:), allocatable **parm::coeff_solpintc**
- real ∗8, dimension(:), allocatable **parm::coeff_psorpmax**
- integer, dimension(:), allocatable parm::isep_typ

septic system type (none)

- integer, dimension(:), allocatable **parm::i_sep**
- integer, dimension(:), allocatable parm::isep_opt

septic system operation flag (1=active, 2=failing, 3=not operated) (none)

- integer, dimension(:), allocatable **parm::sep_tsincefail**
- integer, dimension(:), allocatable **parm::isep_tfail**
- integer, dimension(:), allocatable **parm::isep_iyr**
- integer, dimension(:), allocatable **parm::sep_strm_dist**
- integer, dimension(:), allocatable **parm::sep_den**
- real ∗8, dimension(:), allocatable **parm::sol_sumno3**
- real ∗8, dimension(:), allocatable **parm::sol_sumsolp**
- real ∗8, dimension(:), allocatable **parm::strsw_sum**
- real ∗8, dimension(:), allocatable **parm::strstmp_sum**
- real ∗8, dimension(:), allocatable **parm::strsn_sum**
- real ∗8, dimension(:), allocatable **parm::strsp_sum**
- real ∗8, dimension(:), allocatable **parm::strsa_sum**
- real ∗8, dimension(:), allocatable **parm::spill_hru**
- real ∗8, dimension(:), allocatable **parm::tile_out**
- real ∗8, dimension(:), allocatable **parm::hru_in**
- real ∗8, dimension(:), allocatable **parm::spill_precip**
- real ∗8, dimension(:), allocatable **parm::pot_seep**
- real ∗8, dimension(:), allocatable **parm::pot_evap**
- real ∗8, dimension(:), allocatable **parm::pot_sedin**
- real ∗8, dimension(:), allocatable **parm::pot_solp**
- real ∗8, dimension(:), allocatable **parm::pot_solpi**
- real ∗8, dimension(:), allocatable **parm::pot_orgp**
- real ∗8, dimension(:), allocatable **parm::pot_orgpi**
- real ∗8, dimension(:), allocatable **parm::pot_orgn**
- real ∗8, dimension(:), allocatable **parm::pot_orgni**
- real ∗8, dimension(:), allocatable **parm::pot_mps**
- real ∗8, dimension(:), allocatable **parm::pot_mpsi**
- real ∗8, dimension(:), allocatable **parm::pot_mpa**
- real ∗8, dimension(:), allocatable **parm::pot_mpai**
- real ∗8, dimension(:), allocatable **parm::pot_no3i**
- real ∗8, dimension(:), allocatable **parm::precip_in**
- real ∗8, dimension(:), allocatable **parm::tile_sedo**
- real ∗8, dimension(:), allocatable **parm::tile_no3o**
- real ∗8, dimension(:), allocatable **parm::tile_solpo**
- real ∗8, dimension(:), allocatable **parm::tile_orgno**
- real ∗8, dimension(:), allocatable **parm::tile_orgpo**
- real ∗8, dimension(:), allocatable **parm::tile_minpso**
- real ∗8, dimension(:), allocatable **parm::tile_minpao**
- integer **parm::ia_b**
- integer **parm::ihumus**

- integer **parm::itemp**
- integer **parm::isnow**
- integer, dimension(41) **parm::icolrsv**
- integer, dimension(mhruo) **parm::icols**
- integer, dimension(mrcho) **parm::icolr**
- integer, dimension(msubo) **parm::icolb**
- integer, dimension(46) parm::ipdvar

  output variable codes for output.rch file
- integer, dimension(mhruo) parm::ipdvas

  output varaible codes for output.hru file
- integer, dimension(msubo) parm::ipdvab

  output variable codes for output.sub file
- integer, dimension(:), allocatable parm::ipdhru

  HRUs whose output information will be printed to the output.hru and output.wtr files.
- real ∗8, dimension(mstdo) **parm::wshddayo**
- real ∗8, dimension(mstdo) **parm::wshdmono**
- real ∗8, dimension(mstdo) **parm::wshdyro**
- real ∗8, dimension(16) **parm::fcstaao**
- real ∗8, dimension(mstdo) **parm::wshdaao**
- real ∗8, dimension(:,:), allocatable **parm::wpstdayo**
- real ∗8, dimension(:,:), allocatable **parm::wpstmono**
- real ∗8, dimension(:,:), allocatable **parm::wpstyro**
- real ∗8, dimension(:,:), allocatable **parm::yldkg**
- real ∗8, dimension(:,:), allocatable **parm::bio_hv**
- real ∗8, dimension(:,:), allocatable **parm::wpstaao**
- real ∗8, dimension(:,:), allocatable **parm::rchmono**
- real ∗8, dimension(:,:), allocatable **parm::rchyro**
- real ∗8, dimension(:,:), allocatable **parm::rchaao**
- real ∗8, dimension(:,:), allocatable **parm::rchdy**
- real ∗8, dimension(:,:), allocatable **parm::hrumono**
- real ∗8, dimension(:,:), allocatable **parm::hruyro**
- real ∗8, dimension(:,:), allocatable **parm::hruaao**
- real ∗8, dimension(:,:), allocatable **parm::submono**
- real ∗8, dimension(:,:), allocatable **parm::subyro**
- real ∗8, dimension(:,:), allocatable **parm::subaao**
- real ∗8, dimension(:,:), allocatable **parm::resoutm**
- real ∗8, dimension(:,:), allocatable **parm::resouty**
- real ∗8, dimension(:,:), allocatable **parm::resouta**
- real ∗8, dimension(12, 8) **parm::wshd_aamon**
- real ∗8, dimension(:,:), allocatable **parm::wtrmon**
- real ∗8, dimension(:,:), allocatable **parm::wtryr**
- real ∗8, dimension(:,:), allocatable **parm::wtraa**
- real ∗8, dimension(:,:), allocatable parm::sub_smfmx

  max melt rate for snow during year (June 21) for subbasin(:) where deg C refers to the air temperature. SUB_SMFMX and SMFMN allow the rate of snow melt to vary through the year. These parameters are accounting for the impact of soil temperature on snow melt (range: -5.0/5.0) (mm/deg C/day)
- real ∗8, dimension(:,:), allocatable parm::sub_smfmn

  min melt rate for snow during year (Dec 21) for subbasin(:) (range: -5.0/5.0) where deg C refers to the air temperature (mm/deg C/day)
- real ∗8, dimension(:,:,:), allocatable **parm::hrupstd**
- real ∗8, dimension(:,:,:), allocatable **parm::hrupsta**
- real ∗8, dimension(:,:,:), allocatable **parm::hrupstm**
- real ∗8, dimension(:,:,:), allocatable **parm::hrupsty**
- integer, dimension(:), allocatable **parm::ifirstt**

- integer, dimension(:), allocatable **parm::ifirstpcp**
- integer, dimension(:), allocatable **parm::elevp**
- integer, dimension(:), allocatable **parm::elevt**
- real ∗8, dimension(:,:), allocatable parm::ftmpmn

  avg monthly minimum air temperature (deg C)
- real ∗8, dimension(:,:), allocatable parm::ftmpmx

  avg monthly maximum air temperature (deg C)
- real ∗8, dimension(:,:), allocatable parm::ftmpstdmn

  standard deviation for avg monthly minimum air temperature (deg C)
- real ∗8, dimension(:,:), allocatable parm::ftmpstdmx

  standard deviation for avg monthly maximum air temperature (deg C)
- real ∗8, dimension(:,:,:), allocatable parm::fpcp_stat

  fpcp_stat(:,1,:): average amount of precipitation falling in one day for the month (mm/day)
  fpcp_stat(:,2,:): standard deviation for the average daily precipitation (mm/day)
  fpcp_stat(:,3,:): skew coefficient for the average daily precipitationa (none)
- real ∗8, dimension(:,:), allocatable parm::fpr_w1

  probability of wet day after dry day in month (none)
- real ∗8, dimension(:,:), allocatable parm::fpr_w2

  probability of wet day after wet day in month (none)
- real ∗8, dimension(:,:), allocatable parm::fpr_w3

  proportion of wet days in the month (none)
- real ∗8, dimension(:), allocatable **parm::flwin**
- real ∗8, dimension(:), allocatable **parm::flwout**
- real ∗8, dimension(:), allocatable **parm::bankst**
- real ∗8, dimension(:), allocatable **parm::ch_wi**
- real ∗8, dimension(:), allocatable **parm::ch_d**
- real ∗8, dimension(:), allocatable parm::ch_onco

  channel organic n concentration (ppm)
- real ∗8, dimension(:), allocatable parm::ch_opco

  channel organic p concentration (ppm)
- real ∗8, dimension(:), allocatable **parm::ch_orgn**
- real ∗8, dimension(:), allocatable **parm::ch_orgp**
- real ∗8, dimension(:), allocatable **parm::drift**
- real ∗8, dimension(:), allocatable **parm::rch_dox**
- real ∗8, dimension(:), allocatable **parm::rch_bactp**
- real ∗8, dimension(:), allocatable **parm::alpha_bnk**
- real ∗8, dimension(:), allocatable **parm::alpha_bnke**
- real ∗8, dimension(:), allocatable **parm::disolvp**
- real ∗8, dimension(:), allocatable **parm::algae**
- real ∗8, dimension(:), allocatable **parm::sedst**
- real ∗8, dimension(:), allocatable **parm::rchstor**
- real ∗8, dimension(:), allocatable **parm::organicn**
- real ∗8, dimension(:), allocatable **parm::organicp**
- real ∗8, dimension(:), allocatable **parm::chlora**
- real ∗8, dimension(:), allocatable **parm::nitraten**
- real ∗8, dimension(:), allocatable **parm::nitriten**
- real ∗8, dimension(:), allocatable **parm::ch_li**
- real ∗8, dimension(:), allocatable **parm::ch_si**
- real ∗8, dimension(:), allocatable **parm::ch_bnk_san**
- real ∗8, dimension(:), allocatable **parm::ch_bnk_sil**
- real ∗8, dimension(:), allocatable **parm::ch_bnk_cla**
- real ∗8, dimension(:), allocatable **parm::ch_bnk_gra**
- real ∗8, dimension(:), allocatable **parm::ch_bed_san**

- real ∗8, dimension(:), allocatable **parm::ch_bed_sil**
- real ∗8, dimension(:), allocatable **parm::ch_bed_cla**
- real ∗8, dimension(:), allocatable **parm::ch_bed_gra**
- real ∗8, dimension(:), allocatable **parm::depfp**
- real ∗8, dimension(:), allocatable **parm::depsanfp**
- real ∗8, dimension(:), allocatable **parm::depsilfp**
- real ∗8, dimension(:), allocatable **parm::depclafp**
- real ∗8, dimension(:), allocatable **parm::depsagfp**
- real ∗8, dimension(:), allocatable **parm::deplagfp**
- real ∗8, dimension(:), allocatable **parm::depch**
- real ∗8, dimension(:), allocatable **parm::depsanch**
- real ∗8, dimension(:), allocatable **parm::depsilch**
- real ∗8, dimension(:), allocatable **parm::depclach**
- real ∗8, dimension(:), allocatable **parm::depsagch**
- real ∗8, dimension(:), allocatable **parm::deplagch**
- real ∗8, dimension(:), allocatable **parm::depgrach**
- real ∗8, dimension(:), allocatable **parm::depgrafp**
- real ∗8, dimension(:), allocatable **parm::grast**
- real ∗8, dimension(:), allocatable **parm::depprch**
- real ∗8, dimension(:), allocatable **parm::depprfp**
- real ∗8, dimension(:), allocatable **parm::prf**
- real ∗8, dimension(:), allocatable **parm::r2adj**
- real ∗8, dimension(:), allocatable parm::spcon

  linear parameter for calculating sediment reentrained in channel sediment routing
- real ∗8, dimension(:), allocatable parm::spexp

  exponent parameter for calculating sediment reentrained in channel sediment routing
- real ∗8, dimension(:), allocatable **parm::sanst**
- real ∗8, dimension(:), allocatable **parm::silst**
- real ∗8, dimension(:), allocatable **parm::clast**
- real ∗8, dimension(:), allocatable **parm::sagst**
- real ∗8, dimension(:), allocatable **parm::lagst**
- real ∗8, dimension(:), allocatable **parm::pot_san**
- real ∗8, dimension(:), allocatable **parm::pot_sil**
- real ∗8, dimension(:), allocatable **parm::pot_cla**
- real ∗8, dimension(:), allocatable **parm::pot_sag**
- real ∗8, dimension(:), allocatable **parm::pot_lag**
- real ∗8, dimension(:), allocatable **parm::potsani**
- real ∗8, dimension(:), allocatable **parm::potsili**
- real ∗8, dimension(:), allocatable **parm::potclai**
- real ∗8, dimension(:), allocatable **parm::potsagi**
- real ∗8, dimension(:), allocatable **parm::potlagi**
- real ∗8, dimension(:), allocatable **parm::sanyld**
- real ∗8, dimension(:), allocatable **parm::silyld**
- real ∗8, dimension(:), allocatable **parm::clayld**
- real ∗8, dimension(:), allocatable **parm::sagyld**
- real ∗8, dimension(:), allocatable **parm::lagyld**
- real ∗8, dimension(:), allocatable **parm::grayld**
- real ∗8, dimension(:), allocatable **parm::res_san**
- real ∗8, dimension(:), allocatable **parm::res_sil**
- real ∗8, dimension(:), allocatable **parm::res_cla**
- real ∗8, dimension(:), allocatable **parm::res_sag**
- real ∗8, dimension(:), allocatable **parm::res_lag**
- real ∗8, dimension(:), allocatable **parm::res_gra**
- real ∗8, dimension(:), allocatable **parm::pnd_san**

- real ∗8, dimension(:), allocatable **parm::pnd_sil**
- real ∗8, dimension(:), allocatable **parm::pnd_cla**
- real ∗8, dimension(:), allocatable **parm::pnd_sag**
- real ∗8, dimension(:), allocatable **parm::pnd_lag**
- real ∗8, dimension(:), allocatable **parm::wet_san**
- real ∗8, dimension(:), allocatable **parm::wet_sil**
- real ∗8, dimension(:), allocatable **parm::wet_cla**
- real ∗8, dimension(:), allocatable **parm::wet_lag**
- real ∗8, dimension(:), allocatable **parm::wet_sag**
- real ∗8 **parm::ressano**
- real ∗8 **parm::ressilo**
- real ∗8 **parm::resclao**
- real ∗8 **parm::ressago**
- real ∗8 **parm::reslago**
- real ∗8 **parm::resgrao**
- real ∗8 **parm::ressani**
- real ∗8 **parm::ressili**
- real ∗8 **parm::resclai**
- real ∗8 **parm::ressagi**
- real ∗8 **parm::reslagi**
- real ∗8 **parm::resgrai**
- real ∗8 **parm::potsano**
- real ∗8 **parm::potsilo**
- real ∗8 **parm::potclao**
- real ∗8 **parm::potsago**
- real ∗8 **parm::potlago**
- real ∗8 **parm::pndsanin**
- real ∗8 **parm::pndsilin**
- real ∗8 **parm::pndclain**
- real ∗8 **parm::pndsagin**
- real ∗8 **parm::pndlagin**
- real ∗8 **parm::pndsano**
- real ∗8 **parm::pndsilo**
- real ∗8 **parm::pndclao**
- real ∗8 **parm::pndsago**
- real ∗8 **parm::pndlago**
- real ∗8, dimension(:), allocatable **parm::ch_di**
- real ∗8, dimension(:), allocatable **parm::ch_erod**
- real ∗8, dimension(:), allocatable **parm::ch_l2**
- real ∗8, dimension(:), allocatable **parm::ch_cov**
- real ∗8, dimension(:), allocatable **parm::ch_cov1**
- real ∗8, dimension(:), allocatable **parm::ch_cov2**
- real ∗8, dimension(:), allocatable **parm::ch_bnk_bd**
- real ∗8, dimension(:), allocatable **parm::ch_bed_bd**
- real ∗8, dimension(:), allocatable **parm::ch_bnk_kd**
- real ∗8, dimension(:), allocatable **parm::ch_bed_kd**
- real ∗8, dimension(:), allocatable **parm::ch_bnk_d50**
- real ∗8, dimension(:), allocatable **parm::ch_bed_d50**
- real ∗8, dimension(:), allocatable **parm::tc_bed**
- real ∗8, dimension(:), allocatable **parm::tc_bnk**
- integer, dimension(:), allocatable **parm::ch_eqn**
- real ∗8, dimension(:), allocatable **parm::chpst_conc**
- real ∗8, dimension(:), allocatable **parm::chpst_rea**
- real ∗8, dimension(:), allocatable **parm::chpst_vol**
- real ∗8, dimension(:), allocatable **parm::chpst_koc**

- real ∗8, dimension(:), allocatable **parm::chpst_stl**
- real ∗8, dimension(:), allocatable **parm::chpst_rsp**
- real ∗8, dimension(:), allocatable **parm::chpst_mix**
- real ∗8, dimension(:), allocatable **parm::sedpst_conc**
- real ∗8, dimension(:), allocatable **parm::ch_wdr**
- real ∗8, dimension(:), allocatable **parm::sedpst_rea**
- real ∗8, dimension(:), allocatable **parm::sedpst_bry**
- real ∗8, dimension(:), allocatable **parm::sedpst_act**
- real ∗8, dimension(:), allocatable **parm::rch_cbod**
- real ∗8, dimension(:), allocatable **parm::rch_bactlp**
- real ∗8, dimension(:), allocatable **parm::chside**
- real ∗8, dimension(:), allocatable **parm::rs1**
- real ∗8, dimension(:), allocatable **parm::rs2**
- real ∗8, dimension(:), allocatable **parm::rs3**
- real ∗8, dimension(:), allocatable **parm::rs4**
- real ∗8, dimension(:), allocatable **parm::rs5**
- real ∗8, dimension(:), allocatable **parm::rs6**
- real ∗8, dimension(:), allocatable **parm::rs7**
- real ∗8, dimension(:), allocatable **parm::rk1**
- real ∗8, dimension(:), allocatable **parm::rk2**
- real ∗8, dimension(:), allocatable **parm::rk3**
- real ∗8, dimension(:), allocatable **parm::rk4**
- real ∗8, dimension(:), allocatable **parm::rk5**
- real ∗8, dimension(:), allocatable parm::bc1

  rate constant for biological oxidation of NH3 to NO2 in reach at 20 deg C (1/hr)

- real ∗8, dimension(:), allocatable parm::bc2

  rate constant for biological oxidation of NO2 to NO3 in reach at 20 deg C (1/hr)
- real ∗8, dimension(:), allocatable parm::bc3

  rate constant for hydrolysis of organic N to ammonia in reach at 20 deg C (1/hr)

- real ∗8, dimension(:), allocatable parm::bc4

  rate constant for the decay of organic P to dissolved P in reach at 20 deg C (1/hr)

- real ∗8, dimension(:), allocatable **parm::rk6**
- real ∗8, dimension(:), allocatable **parm::ammonian**
- real ∗8, dimension(:), allocatable **parm::orig_sedpstconc**
- real ∗8, dimension(:,:), allocatable **parm::wurch**
- integer, dimension(:), allocatable **parm::icanal**
- integer, dimension(:), allocatable **parm::itb**
- real ∗8, dimension(:), allocatable **parm::ch_revap**
- real ∗8, dimension(:), allocatable **parm::dep_chan**
- real ∗8, dimension(:), allocatable parm::harg_petco

  coefficient related to radiation used in hargreaves eq (range: 0.0019 - 0.0032)
- real ∗8, dimension(:), allocatable **parm::subfr_nowtr**
- real ∗8, dimension(:), allocatable parm::cncoef_sub

  soil water depletion coefficient used in the new (modified curve number method) same as soil index coeff used in APEX range: 0.5 - 2.0
- real ∗8, dimension(:), allocatable **parm::dr_sub**
- real ∗8, dimension(:), allocatable **parm::wcklsp**
- real ∗8, dimension(:), allocatable **parm::sub_fr**
- real ∗8, dimension(:), allocatable **parm::sub_minp**
- real ∗8, dimension(:), allocatable **parm::sub_sw**
- real ∗8, dimension(:), allocatable **parm::sub_sumfc**

- real ∗8, dimension(:), allocatable **parm::sub_gwno3**
- real ∗8, dimension(:), allocatable **parm::sub_gwsolp**
- real ∗8, dimension(:), allocatable parm::co2

  CO2 concentration (ppmv)
- real ∗8, dimension(:), allocatable parm::sub_km

  area of subbasin in square kilometers (km^ 2)
- real ∗8, dimension(:), allocatable **parm::sub_tc**
- real ∗8, dimension(:), allocatable **parm::wlat**
- real ∗8, dimension(:), allocatable **parm::sub_pet**
- real ∗8, dimension(:), allocatable **parm::welev**
- real ∗8, dimension(:), allocatable **parm::sub_orgn**
- real ∗8, dimension(:), allocatable **parm::sub_orgp**
- real ∗8, dimension(:), allocatable **parm::sub_bd**
- real ∗8, dimension(:), allocatable **parm::sub_wtmp**
- real ∗8, dimension(:), allocatable **parm::sub_sedpa**
- real ∗8, dimension(:), allocatable **parm::sub_sedps**
- real ∗8, dimension(:), allocatable **parm::sub_minpa**
- real ∗8, dimension(:), allocatable **parm::sub_minps**
- real ∗8, dimension(:), allocatable **parm::daylmn**
- real ∗8, dimension(:), allocatable **parm::latcos**
- real ∗8, dimension(:), allocatable **parm::latsin**
- real ∗8, dimension(:), allocatable **parm::phutot**
- real ∗8, dimension(:), allocatable parm::plaps

  precipitation lapse rate: precipitation change due to change in elevation (mm H2O/km)
- real ∗8, dimension(:), allocatable parm::tlaps

  temperature lapse rate: temperature change due to change in elevation (deg C/km)
- real ∗8, dimension(:), allocatable **parm::tmp_an**
- real ∗8, dimension(:), allocatable **parm::sub_precip**
- real ∗8, dimension(:), allocatable **parm::pcpdays**
- real ∗8, dimension(:), allocatable **parm::rcn_sub**
- real ∗8, dimension(:), allocatable **parm::rammo_sub**
- real ∗8, dimension(:), allocatable **parm::atmo_day**
- real ∗8, dimension(:), allocatable **parm::sub_snom**
- real ∗8, dimension(:), allocatable **parm::sub_qd**
- real ∗8, dimension(:), allocatable **parm::sub_sedy**
- real ∗8, dimension(:), allocatable **parm::sub_tran**
- real ∗8, dimension(:), allocatable **parm::sub_no3**
- real ∗8, dimension(:), allocatable **parm::sub_latno3**
- real ∗8, dimension(:,:), allocatable parm::sub_sftmp

  snowfall temperature for subbasin(:). Mean air temperature at which precip is equally likely to be rain as snow/freezing rain (range: -5.0/5.0) (deg C)
- real ∗8, dimension(:,:), allocatable parm::sub_smtmp

  snow melt base temperature for subbasin(:) mean air temperature at which snow melt will occur (range: -5.0/5.0) (deg C)
- real ∗8, dimension(:,:), allocatable **parm::sub_timp**
- real ∗8, dimension(:), allocatable **parm::sub_tileno3**
- real ∗8, dimension(:), allocatable **parm::sub_solp**
- real ∗8, dimension(:), allocatable **parm::sub_subp**
- real ∗8, dimension(:), allocatable **parm::sub_etday**
- real ∗8, dimension(:), allocatable parm::sub_elev

  average elevation of subbasin (m)
- real ∗8, dimension(:), allocatable **parm::sub_wyld**
- real ∗8, dimension(:), allocatable **parm::sub_surfq**
- real ∗8, dimension(:), allocatable **parm::qird**

- real ∗8, dimension(:), allocatable **parm::sub_gwq**
- real ∗8, dimension(:), allocatable **parm::sub_sep**
- real ∗8, dimension(:), allocatable **parm::sub_chl**
- real ∗8, dimension(:), allocatable **parm::sub_cbod**
- real ∗8, dimension(:), allocatable **parm::sub_dox**
- real ∗8, dimension(:), allocatable **parm::sub_solpst**
- real ∗8, dimension(:), allocatable **parm::sub_sorpst**
- real ∗8, dimension(:), allocatable **parm::sub_yorgn**
- real ∗8, dimension(:), allocatable **parm::sub_yorgp**
- real ∗8, dimension(:), allocatable parm::sub_lat

  latitude of subbasin (degrees)
- real ∗8, dimension(:), allocatable **parm::sub_bactp**
- real ∗8, dimension(:), allocatable **parm::sub_bactlp**
- real ∗8, dimension(:), allocatable **parm::sub_latq**
- real ∗8, dimension(:), allocatable **parm::sub_gwq_d**
- real ∗8, dimension(:), allocatable **parm::sub_tileq**
- real ∗8, dimension(:), allocatable **parm::sub_vaptile**
- real ∗8, dimension(:), allocatable **parm::sub_dsan**
- real ∗8, dimension(:), allocatable **parm::sub_dsil**
- real ∗8, dimension(:), allocatable **parm::sub_dcla**
- real ∗8, dimension(:), allocatable **parm::sub_dsag**
- real ∗8, dimension(:), allocatable **parm::sub_dlag**
- real ∗8 **parm::vap_tile**
- real ∗8, dimension(:), allocatable **parm::wnan**
- real ∗8, dimension(:,:), allocatable **parm::sol_stpwt**
- real ∗8, dimension(:,:), allocatable **parm::sub_pst**
- real ∗8, dimension(:,:), allocatable **parm::sub_hhqd**
- real ∗8, dimension(:,:), allocatable **parm::sub_hhwtmp**
- real ∗8, dimension(:,:), allocatable parm::huminc

  monthly humidity adjustment. Daily values for relative humidity within the month are rasied or lowered by the specified amount (used in climate change studies) (none)
- real ∗8, dimension(:,:), allocatable parm::radinc

  monthly solar radiation adjustment. Daily radiation within the month is raised or lowered by the specified amount. (used in climate change studies) (MJ/m^2)
- real ∗8, dimension(:,:), allocatable parm::rfinc

  monthly rainfall adjustment. Daily rainfall within the month is adjusted to the specified percentage of the original value (used in climate change studies)(%)
- real ∗8, dimension(:,:), allocatable parm::tmpinc

  monthly temperature adjustment. Daily maximum and minimum temperatures within the month are raised or lowered by the specified amount (used in climate change studies) (deg C)
- real ∗8, dimension(:), allocatable parm::ch_k1

  effective hydraulic conductivity of tributary channel alluvium (mm/hr)
- real ∗8, dimension(:), allocatable **parm::ch_k2**
- real ∗8, dimension(:,:), allocatable parm::elevb

  elevation at the center of the band (m)
- real ∗8, dimension(:,:), allocatable parm::elevb_fr

  fraction of subbasin area within elevation band (the same fractions should be listed for all HRUs within the subbasin) (none)
- real ∗8, dimension(:,:), allocatable **parm::wndav**
- real ∗8, dimension(:), allocatable parm::ch_n1

  Manning's "n" value for the tributary channels (none)
- real ∗8, dimension(:), allocatable **parm::ch_n2**
- real ∗8, dimension(:), allocatable parm::ch_s1

  average slope of tributary channels (m/m)

- real ∗8, dimension(:), allocatable **parm::ch_s2**
- real ∗8, dimension(:), allocatable parm::ch_w1

  average width of tributary channels (m)
- real ∗8, dimension(:), allocatable **parm::ch_w2**
- real ∗8, dimension(:,:), allocatable **parm::dewpt**
- real ∗8, dimension(:,:), allocatable **parm::amp_r**
- real ∗8, dimension(:,:), allocatable **parm::solarav**
- real ∗8, dimension(:,:), allocatable **parm::tmpstdmx**
- real ∗8, dimension(:,:), allocatable **parm::tmpstdmn**
- real ∗8, dimension(:,:), allocatable **parm::pcf**
- real ∗8, dimension(:,:), allocatable **parm::tmpmn**
- real ∗8, dimension(:,:), allocatable **parm::tmpmx**
- real ∗8, dimension(:,:), allocatable **parm::otmpstdmn**
- real ∗8, dimension(:,:), allocatable **parm::otmpmn**
- real ∗8, dimension(:,:), allocatable **parm::otmpmx**
- real ∗8, dimension(:,:), allocatable **parm::otmpstdmx**
- real ∗8, dimension(:,:), allocatable **parm::ch_erodmo**
- real ∗8, dimension(:,:), allocatable **parm::uh**
- real ∗8, dimension(:,:), allocatable **parm::hqdsave**
- real ∗8, dimension(:,:), allocatable **parm::hsdsave**
- real ∗8, dimension(:,:), allocatable **parm::pr_w1**
- real ∗8, dimension(:,:), allocatable **parm::pr_w2**
- real ∗8, dimension(:,:), allocatable **parm::pr_w3**
- real ∗8, dimension(:,:,:), allocatable **parm::pcp_stat**
- real ∗8, dimension(:,:), allocatable **parm::opr_w1**
- real ∗8, dimension(:,:), allocatable **parm::opr_w2**
- real ∗8, dimension(:,:), allocatable **parm::opr_w3**
- real ∗8, dimension(:,:,:), allocatable **parm::opcp_stat**
- integer, dimension(:), allocatable **parm::hrutot**
- integer, dimension(:), allocatable **parm::hru1**
- integer, dimension(:), allocatable **parm::ireg**
- integer, dimension(:), allocatable parm::ihgage

  subbasin relative humidity data code (none)
- integer, dimension(:), allocatable parm::isgage

  subbasin radiation gage data code (none)
- integer, dimension(:), allocatable parm::iwgage

  subbasin wind speed gage data code (none)
- integer, dimension(:), allocatable parm::subgis

  GIS code printed to output files (output.sub) (none.
- integer, dimension(:), allocatable parm::irgage

  subbasin rain gage data code (none)
- integer, dimension(:), allocatable parm::itgage

  subbasin temp gage data code (none)
- integer, dimension(:), allocatable **parm::fcst_reg**
- integer, dimension(:), allocatable **parm::irelh**
- real ∗8, dimension(:,:), allocatable **parm::sol_aorgn**
- real ∗8, dimension(:,:), allocatable **parm::sol_tmp**
- real ∗8, dimension(:,:), allocatable **parm::sol_fon**
- real ∗8, dimension(:,:), allocatable **parm::sol_awc**
- real ∗8, dimension(:,:), allocatable **parm::sol_prk**
- real ∗8, dimension(:,:), allocatable **parm::volcr**
- real ∗8, dimension(:,:), allocatable parm::pperco_sub

subbasin phosphorus percolation coefficient. Ratio of soluble phosphorus in surface to soluble phosphorus in percolate

- real ∗8, dimension(:,:), allocatable **parm::sol_actp**
- real ∗8, dimension(:,:), allocatable **parm::sol_stap**
- real ∗8, dimension(:,:), allocatable **parm::conv_wt**
- real ∗8, dimension(:,:), allocatable **parm::sol_solp**
- real ∗8, dimension(:,:), allocatable **parm::sol_ul**
- real ∗8, dimension(:,:), allocatable **parm::sol_fc**
- real ∗8, dimension(:,:), allocatable **parm::crdep**
- real ∗8, dimension(:,:), allocatable **parm::sol_z**
- real ∗8, dimension(:,:), allocatable **parm::sol_up**
- real ∗8, dimension(:,:), allocatable **parm::sol_bd**
- real ∗8, dimension(:,:), allocatable **parm::sol_st**
- real ∗8, dimension(:,:), allocatable **parm::flat**
- real ∗8, dimension(:,:), allocatable **parm::sol_nh3**
- real ∗8, dimension(:,:), allocatable **parm::sol_hk**
- real ∗8, dimension(:,:), allocatable **parm::sol_clay**
- real ∗8, dimension(:,:), allocatable **parm::sol_ec**
- real ∗8, dimension(:,:), allocatable **parm::sol_orgn**
- real ∗8, dimension(:,:), allocatable **parm::sol_por**
- real ∗8, dimension(:,:), allocatable **parm::sol_wp**
- real ∗8, dimension(:,:), allocatable **parm::sol_orgp**
- real ∗8, dimension(:,:), allocatable **parm::sol_hum**
- real ∗8, dimension(:,:), allocatable **parm::sol_wpmm**
- real ∗8, dimension(:,:), allocatable **parm::sol_k**
- real ∗8, dimension(:,:), allocatable **parm::sol_cbn**
- real ∗8, dimension(:,:), allocatable **parm::sol_no3**
- real ∗8, dimension(:,:), allocatable **parm::sol_rsd**
- real ∗8, dimension(:,:), allocatable **parm::sol_fop**
- real ∗8, dimension(:,:), allocatable **parm::sol_silt**
- real ∗8, dimension(:,:), allocatable **parm::sol_sand**
- real ∗8, dimension(:,:), allocatable **parm::sol_rock**
- real ∗8, dimension(:,:), allocatable **parm::orig_solno3**
- real ∗8, dimension(:,:), allocatable **parm::orig_solorgn**
- real ∗8, dimension(:,:), allocatable **parm::orig_solsolp**
- real ∗8, dimension(:,:), allocatable **parm::orig_solorgp**
- real ∗8, dimension(:,:), allocatable **parm::orig_soltmp**
- real ∗8, dimension(:,:), allocatable **parm::orig_solrsd**
- real ∗8, dimension(:,:), allocatable **parm::orig_solfop**
- real ∗8, dimension(:,:), allocatable **parm::orig_solfon**
- real ∗8, dimension(:,:), allocatable **parm::orig_solaorgn**
- real ∗8, dimension(:,:), allocatable **parm::orig_solst**
- real ∗8, dimension(:,:), allocatable **parm::orig_solactp**
- real ∗8, dimension(:,:), allocatable **parm::orig_solstap**
- real ∗8, dimension(:,:), allocatable **parm::orig_volcr**
- real ∗8, dimension(:,:), allocatable **parm::conk**
- real ∗8, dimension(:,:,:), allocatable **parm::sol_pst**
- real ∗8, dimension(:,:,:), allocatable **parm::sol_kp**
- real ∗8, dimension(:,:,:), allocatable **parm::orig_solpst**
- real ∗8, dimension(:), allocatable **parm::velsetlr**
- real ∗8, dimension(:), allocatable **parm::velsetlp**
- real ∗8, dimension(:), allocatable **parm::br1**
- real ∗8, dimension(:), allocatable **parm::res_k**
- real ∗8, dimension(:), allocatable **parm::lkpst_conc**
- real ∗8, dimension(:), allocatable **parm::evrsv**

- real ∗8, dimension(:), allocatable **parm::res_evol**
- real ∗8, dimension(:), allocatable **parm::res_pvol**
- real ∗8, dimension(:), allocatable **parm::res_vol**
- real ∗8, dimension(:), allocatable **parm::res_psa**
- real ∗8, dimension(:), allocatable **parm::lkpst_rea**
- real ∗8, dimension(:), allocatable **parm::lkpst_vol**
- real ∗8, dimension(:), allocatable **parm::br2**
- real ∗8, dimension(:), allocatable **parm::res_rr**
- real ∗8, dimension(:), allocatable **parm::res_sed**
- real ∗8, dimension(:), allocatable **parm::lkpst_koc**
- real ∗8, dimension(:), allocatable **parm::lkpst_stl**
- real ∗8, dimension(:), allocatable **parm::lkpst_rsp**
- real ∗8, dimension(:), allocatable **parm::lkpst_mix**
- real ∗8, dimension(:), allocatable **parm::lkspst_conc**
- real ∗8, dimension(:), allocatable **parm::lkspst_rea**
- real ∗8, dimension(:), allocatable **parm::theta_n**
- real ∗8, dimension(:), allocatable **parm::theta_p**
- real ∗8, dimension(:), allocatable **parm::con_nirr**
- real ∗8, dimension(:), allocatable **parm::con_pirr**
- real ∗8, dimension(:), allocatable **parm::lkspst_bry**
- real ∗8, dimension(:), allocatable **parm::lkspst_act**
- real ∗8, dimension(:), allocatable **parm::sed_stlr**
- real ∗8, dimension(7) **parm::resdata**
- real ∗8, dimension(:), allocatable **parm::wurtnf**
- real ∗8, dimension(:), allocatable **parm::res_nsed**
- real ∗8, dimension(:), allocatable **parm::chlar**
- real ∗8, dimension(:), allocatable **parm::res_orgn**
- real ∗8, dimension(:), allocatable **parm::res_orgp**
- real ∗8, dimension(:), allocatable **parm::res_no3**
- real ∗8, dimension(:), allocatable **parm::res_solp**
- real ∗8, dimension(:), allocatable **parm::res_chla**
- real ∗8, dimension(:), allocatable **parm::res_seci**
- real ∗8, dimension(:), allocatable **parm::res_esa**
- real ∗8, dimension(:), allocatable **parm::seccir**
- real ∗8, dimension(:), allocatable **parm::res_no2**
- real ∗8, dimension(:), allocatable **parm::res_nh3**
- real ∗8, dimension(:), allocatable **parm::res_bactp**
- real ∗8, dimension(:), allocatable **parm::res_bactlp**
- real ∗8, dimension(:), allocatable **parm::oflowmn_fps**
- real ∗8, dimension(:), allocatable **parm::starg_fps**
- real ∗8, dimension(:), allocatable **parm::weirc**
- real ∗8, dimension(:), allocatable **parm::weirk**
- real ∗8, dimension(:), allocatable **parm::weirw**
- real ∗8, dimension(:), allocatable **parm::acoef**
- real ∗8, dimension(:), allocatable **parm::bcoef**
- real ∗8, dimension(:), allocatable **parm::ccoef**
- real ∗8, dimension(:), allocatable **parm::orig_resvol**
- real ∗8, dimension(:), allocatable **parm::orig_ressed**
- real ∗8, dimension(:), allocatable **parm::orig_lkpstconc**
- real ∗8, dimension(:), allocatable **parm::orig_lkspstconc**
- real ∗8, dimension(:), allocatable **parm::orig_ressolp**
- real ∗8, dimension(:), allocatable **parm::orig_resorgp**
- real ∗8, dimension(:), allocatable **parm::orig_resno3**
- real ∗8, dimension(:), allocatable **parm::orig_resno2**
- real ∗8, dimension(:), allocatable **parm::orig_resnh3**

- real ∗8, dimension(:), allocatable **parm::orig_resorgn**
- real ∗8, dimension(:,:), allocatable **parm::starg**
- real ∗8, dimension(:,:), allocatable **parm::oflowmx**
- real ∗8, dimension(:,:), allocatable **parm::oflowmn**
- real ∗8, dimension(:,:), allocatable **parm::psetlr**
- real ∗8, dimension(:,:), allocatable **parm::nsetlr**
- real ∗8, dimension(:,:), allocatable **parm::wuresn**
- real ∗8, dimension(:,:,:), allocatable **parm::res_out**
- integer, dimension(:), allocatable **parm::ires1**
- integer, dimension(:), allocatable **parm::ires2**
- integer, dimension(:), allocatable **parm::res_sub**
- integer, dimension(:), allocatable **parm::iresco**
- integer, dimension(:), allocatable **parm::mores**
- integer, dimension(:), allocatable **parm::iyres**
- integer, dimension(:), allocatable **parm::iflod1r**
- integer, dimension(:), allocatable **parm::iflod2r**
- integer, dimension(:), allocatable **parm::ndtargr**
- real ∗8, dimension(:), allocatable parm::ap_ef

  application efficiency (0-1) (none)
- real ∗8, dimension(:), allocatable parm::decay_f

  exponential of the rate constant for degradation of the pesticide on foliage (none)
- real ∗8, dimension(:), allocatable parm::skoc

  soil adsorption coefficient normalized for soil organic carbon content ((mg/kg)/(mg/L))
- real ∗8, dimension(:), allocatable parm::decay_s

  exponential of the rate constant for degradation of the pesticide in soil (none)
- real ∗8, dimension(:), allocatable parm::hlife_f

  half-life of pesticide on foliage (days)
- real ∗8, dimension(:), allocatable parm::hlife_s

  half-life of pesticide in soil (days)
- real ∗8, dimension(:), allocatable parm::pst_wof

  fraction of pesticide on foliage which is washed-off by a rainfall event (none)
- real ∗8, dimension(:), allocatable parm::pst_wsol

  solubility of chemical in water (mg/L (ppm))
- real ∗8, dimension(:), allocatable **parm::irramt**
- real ∗8, dimension(:), allocatable **parm::phusw**
- real ∗8, dimension(:), allocatable **parm::phusw_nocrop**
- integer, dimension(:), allocatable parm::pstflg

  flag for types of pesticide used in watershed array location is pesticide ID number
  0: pesticide not used
  1: pesticide used
- integer, dimension(:), allocatable **parm::nope**
- integer, dimension(:), allocatable **parm::nop**
- integer, dimension(:), allocatable **parm::yr_skip**
- integer, dimension(:), allocatable **parm::isweep**
- integer, dimension(:), allocatable **parm::icrmx**
- integer, dimension(:), allocatable **parm::nopmx**
- integer, dimension(:,:), allocatable **parm::mgtop**
- integer, dimension(:,:), allocatable **parm::idop**
- integer, dimension(:,:), allocatable **parm::mgt1iop**
- integer, dimension(:,:), allocatable **parm::mgt2iop**
- integer, dimension(:,:), allocatable **parm::mgt3iop**
- real ∗8, dimension(:,:), allocatable **parm::mgt4op**
- real ∗8, dimension(:,:), allocatable **parm::mgt5op**

- real ∗8, dimension(:,:), allocatable **parm::mgt6op**
- real ∗8, dimension(:,:), allocatable **parm::mgt7op**
- real ∗8, dimension(:,:), allocatable **parm::mgt8op**
- real ∗8, dimension(:,:), allocatable **parm::mgt9op**
- real ∗8, dimension(:,:), allocatable **parm::mgt10iop**
- real ∗8, dimension(:,:), allocatable **parm::phu_op**
- real ∗8, dimension(:), allocatable parm::cnyld

  fraction of nitrogen in yield (kg N/kg yield)
- real ∗8, dimension(:), allocatable parm::rsdco_pl

  plant residue decomposition coefficient. The fraction of residue which will decompose in a day assuming optimal moisture, temperature, C:N ratio, and C:P ratio (none)
- real ∗8, dimension(:), allocatable parm::wac21

  1st shape parameter for radiation use efficiency equation (none)
- real ∗8, dimension(:), allocatable parm::wac22

  2nd shape parameter for radiation use efficiency equation (none)
- real ∗8, dimension(:), allocatable parm::alai_min

  minimum LAI during winter dormant period (m^2/m^2)
- real ∗8, dimension(:), allocatable parm::leaf1

  1st shape parameter for leaf area development equation (none)
- real ∗8, dimension(:), allocatable parm::leaf2

  2nd shape parameter for leaf area development equation (none)
- real ∗8, dimension(:), allocatable parm::wsyf

  Value of harvest index between 0 and HVSTI which represents the lowest value expected due to water stress ((kg/ha)/(kg/ha))
- real ∗8, dimension(:), allocatable parm::bio_e

  biomass-energy ratio. The potential (unstressed) growth rate per unit of intercepted photosynthetically active radiation.((kg/ha)/(MJ/m∗∗2))
- real ∗8, dimension(:), allocatable parm::hvsti

  harvest index: crop yield/aboveground biomass ((kg/ha)/(kg/ha))
- real ∗8, dimension(:), allocatable parm::t_base

  minimum temperature for plant growth (deg C)
- real ∗8, dimension(:), allocatable parm::t_opt

  optimal temperature for plant growth (deg C)
- real ∗8, dimension(:), allocatable parm::chtmx

  maximum canopy height (m)
- real ∗8, dimension(:), allocatable parm::cvm

  natural log of USLE_C (none)
- real ∗8, dimension(:), allocatable parm::gsi

  maximum stomatal conductance (m/s)
- real ∗8, dimension(:), allocatable parm::vpd2

  rate of decline in stomatal conductance per unit increase in vapor pressure deficit ((m/s)∗(1/kPa))
- real ∗8, dimension(:), allocatable parm::wavp

  rate of decline in radiation use efficiency as a function of vapor pressure deficit (none)
- real ∗8, dimension(:), allocatable parm::bio_leaf

  fraction of leaf/needle biomass that drops during dormancy (for trees only) (none)
- real ∗8, dimension(:), allocatable parm::blai

  maximum (potential) leaf area index (none)
- real ∗8, dimension(:), allocatable parm::cpyld

  fraction of phosphorus in yield (kg P/kg yield)
- real ∗8, dimension(:), allocatable parm::dlai

  fraction of growing season when leaf area declines (none)
- real ∗8, dimension(:), allocatable parm::rdmx

maximum root depth (m)

- real ∗8, dimension(:), allocatable parm::bio_n1

  1st shape parameter for plant N uptake equation (none)
- real ∗8, dimension(:), allocatable parm::bio_n2

  2nd shape parameter for plant N uptake equation (none)
- real ∗8, dimension(:), allocatable parm::bio_p1

  1st shape parameter for plant P uptake equation (none)
- real ∗8, dimension(:), allocatable parm::bio_p2

  2st shape parameter for plant P uptake equation (none)
- real ∗8, dimension(:), allocatable parm::bm_dieoff

  fraction above ground biomass that dies off at dormancy (fraction)
- real ∗8, dimension(:), allocatable **parm::bmx_trees**
- real ∗8, dimension(:), allocatable **parm::ext_coef**
- real ∗8, dimension(:), allocatable parm::rsr1

  initial root to shoot ratio at the beg of growing season
- real ∗8, dimension(:), allocatable parm::rsr2

  root to shoot ratio at the end of the growing season
- real ∗8, dimension(:,:), allocatable parm::pltnfr

  pltnfr(1,:) nitrogen uptake parameter #1: normal fraction of N in crop biomass at emergence (kg N/kg biomass)
  pltnfr(2,:) nitrogen uptake parameter #2: normal fraction of N in crop biomass at 0.5 maturity (kg N/kg biomass)
  pltnfr(3,:) nitrogen uptake parameter #3: normal fraction of N in crop biomass at maturity (kg N/kg biomass)
- real ∗8, dimension(:,:), allocatable parm::pltpfr

  pltpfr(1,:) phosphorus uptake parameter #1: normal fraction of P in crop biomass at emergence (kg P/kg biomass)
  pltpfr(2,:) phosphorus uptake parameter #2: normal fraction of P in crop biomass at 0.5 maturity (kg P/kg biomass)
  pltpfr(3,:) phosphorus uptake parameter #3: normal fraction of P in crop biomass at maturity (kg P/kg biomass)
- integer, dimension(:), allocatable parm::idc

  crop/landcover category:
  1 warm season annual legume
  2 cold season annual legume
  3 perennial legume
  4 warm season annual
  5 cold season annual
  6 perennial
  7 trees
- integer, dimension(:), allocatable **parm::mat_yrs**
- real ∗8, dimension(:), allocatable parm::bactpdb

  concentration of persistent bacteria in manure (fertilizer) (cfu/g manure)
- real ∗8, dimension(:), allocatable parm::fminn

  fraction of mineral N (NO3 + NH3) (kg minN/kg fert)
- real ∗8, dimension(:), allocatable parm::forgn

  fraction of organic N (kg orgN/kg fert)
- real ∗8, dimension(:), allocatable parm::forgp

  fraction of organic P (kg orgP/kg fert)
- real ∗8, dimension(:), allocatable parm::bactkddb

  bacteria partition coefficient (none):
  1: all bacteria in solution
  0: all bacteria sorbed to soil particles
- real ∗8, dimension(:), allocatable parm::bactlpdb

  concentration of less persistent bacteria in manure (fertilizer) (cfu/g manure)
- real ∗8, dimension(:), allocatable parm::fminp

  fraction of mineral P (kg minP/kg fert)
- real ∗8, dimension(:), allocatable parm::fnh3n

  fraction of NH3-N in mineral N (kg NH3-N/kg minN)
- character(len=8), dimension(200) parm::fertnm

name of fertilizer

- real ∗8, dimension(:), allocatable parm::curbden

  curb length density in HRU (km/ha)
- real ∗8, dimension(:), allocatable parm::dirtmx

  maximum amount of solids allowed to build up on impervious surfaces (kg/curb km)
- real ∗8, dimension(:), allocatable parm::fimp

  fraction of HRU area that is impervious (both directly and indirectly connected)(fraction)
- real ∗8, dimension(:), allocatable parm::urbcoef

  wash-off coefficient for removal of constituents from an impervious surface (1/mm)
- real ∗8, dimension(:), allocatable parm::thalf

  time for the amount of solids on impervious areas to build up to 1/2 the maximum level (days)
- real ∗8, dimension(:), allocatable parm::tnconc

  concentration of total nitrogen in suspended solid load from impervious areas (mg N/kg sed)
- real ∗8, dimension(:), allocatable parm::tno3conc

  concentration of NO3-N in suspended solid load from impervious areas (mg NO3-N/kg sed)
- real ∗8, dimension(:), allocatable parm::tpconc

  concentration of total phosphorus in suspended solid load from impervious areas (mg P/kg sed)
- real ∗8, dimension(:), allocatable parm::fcimp

  fraction of HRU area that is classified as directly connected impervious (fraction)
- real ∗8, dimension(:), allocatable parm::urbcn2

  SCS curve number for moisture condition II in impervious areas (none)
- real ∗8 **parm::sweepeff**
- real ∗8 **parm::frt_kg**
- real ∗8 **parm::pst_dep**
- real ∗8 **parm::fr_curb**
- real ∗8, dimension(:), allocatable **parm::ranrns_hru**
- integer, dimension(:), allocatable **parm::itill**
- real ∗8, dimension(:), allocatable parm::deptil

  depth of mixing caused by operation (mm)
- real ∗8, dimension(:), allocatable parm::effmix

  mixing efficiency of operation (none)
- real ∗8, dimension(:), allocatable parm::ranrns

  random roughness of a given tillage operation (mm)
- character(len=8), dimension(550) parm::tillnm

  8-character name for the tillage operation
- real ∗8, dimension(:), allocatable parm::rnum1s

  For ICODES equal to (none)
  0,1,3,5,9: not used
  2: Fraction of flow in channel
  4: amount of water transferred (as defined by INUM4S)
  7,8,10,11: drainage area in square kilometers associated with the record file.
- real ∗8, dimension(:), allocatable **parm::hyd_dakm**
- real ∗8, dimension(:,:), allocatable **parm::varoute**
- real ∗8, dimension(:,:), allocatable **parm::shyd**
- real ∗8, dimension(:,:), allocatable **parm::vartran**
- real ∗8, dimension(:,:,:), allocatable **parm::hhvaroute**
- integer, dimension(:), allocatable parm::icodes

  routing command code (none):
  0 = finish
  1 = subbasin
  2 = route
  3 = routres
  4 = transfer

5 = add
6 = rechour
7 = recmon
8 = recyear
9 = save
10 = recday
11 = reccnst
12 = structure
13 = apex
14 = saveconc
15 =

- integer, dimension(:), allocatable parm::ihouts

  For ICODES equal to (none)
  0: not used
  1,2,3,5,7,8,10,11: hydrograph storage location number
  4: departure type (1=reach, 2=reservoir)
  9: hydrograph storage location of data to be printed to event file
  14:hydrograph storage location of data to be printed to saveconc file.
- integer, dimension(:), allocatable parm::inum1s

  For ICODES equal to (none)
  0: not used
  1: subbasin number
  2: reach number
  3: reservoir number
  4: reach or res # flow is diverted from
  5: hydrograph storage location of 1st dataset to be added
  7,8,9,10,11,14: file number.
- integer, dimension(:), allocatable parm::inum2s

  For ICODES equal to (none)
  0,1,7,8,10,11: not used
  2,3: inflow hydrograph storage location
  4: destination type (1=reach, 2=reservoir)
  5: hydrograph storage location of 2nd dataset to be added
  9,14:print frequency (0=daily, 1=hourly)
- integer, dimension(:), allocatable parm::inum3s

  For ICODES equal to (none)
  0,1,2,3,5,7,8,10,11: not used
  4: destination number. Reach or reservoir receiving water
  9: print format (0=normal, fixed format; 1=txt format for AV interface, recday)
- integer, dimension(:), allocatable parm::inum4s

  For ICODES equal to (none)
  0,2,3,5,7,8,9,10,11: not used
  1: GIS code printed to output file (optional)
  4: rule code governing transfer of water (1=fraction transferred out, 2=min volume or flow left, 3=exact amount transferred)
- integer, dimension(:), allocatable **parm::inum5s**
- integer, dimension(:), allocatable **parm::inum6s**
- integer, dimension(:), allocatable **parm::inum7s**
- integer, dimension(:), allocatable **parm::inum8s**
- integer, dimension(:), allocatable **parm::subed**
- character(len=10), dimension(:), allocatable **parm::recmonps**
- character(len=10), dimension(:), allocatable **parm::reccnstps**
- character(len=5), dimension(:), allocatable **parm::subnum**
- character(len=4), dimension(:), allocatable **parm::hruno**
- real ∗8, dimension(:), allocatable **parm::grwat_n**
- real ∗8, dimension(:), allocatable **parm::grwat_i**
- real ∗8, dimension(:), allocatable **parm::grwat_l**
- real ∗8, dimension(:), allocatable **parm::grwat_w**
- real ∗8, dimension(:), allocatable **parm::grwat_d**

- real ∗8, dimension(:), allocatable **parm::grwat_s**
- real ∗8, dimension(:), allocatable **parm::grwat_spcon**
- real ∗8, dimension(:), allocatable **parm::tc_gwat**
- real ∗8, dimension(:), allocatable **parm::pot_volmm**
- real ∗8, dimension(:), allocatable **parm::pot_tilemm**
- real ∗8, dimension(:), allocatable **parm::pot_volxmm**
- real ∗8, dimension(:), allocatable **parm::pot_fr**
- real ∗8, dimension(:), allocatable **parm::pot_tile**
- real ∗8, dimension(:), allocatable **parm::pot_vol**
- real ∗8, dimension(:), allocatable **parm::potsa**
- real ∗8, dimension(:), allocatable **parm::pot_volx**
- real ∗8, dimension(:), allocatable **parm::potflwi**
- real ∗8, dimension(:), allocatable **parm::potsedi**
- real ∗8, dimension(:), allocatable **parm::wfsh**
- real ∗8, dimension(:), allocatable **parm::pot_nsed**
- real ∗8, dimension(:), allocatable **parm::pot_no3l**
- real ∗8, dimension(:), allocatable **parm::newrti**
- real ∗8, dimension(:), allocatable **parm::gwno3**
- real ∗8, dimension(:), allocatable **parm::pot_sed**
- real ∗8, dimension(:), allocatable **parm::pot_no3**
- real ∗8, dimension(:), allocatable **parm::fsred**
- real ∗8, dimension(:), allocatable **parm::tmpavp**
- real ∗8, dimension(:), allocatable **parm::evpot**
- real ∗8, dimension(:), allocatable **parm::dis_stream**
- real ∗8, dimension(:), allocatable **parm::pot_solpl**
- real ∗8, dimension(:), allocatable **parm::sed_con**
- real ∗8, dimension(:), allocatable **parm::orgn_con**
- real ∗8, dimension(:), allocatable **parm::orgp_con**
- real ∗8, dimension(:), allocatable **parm::soln_con**
- real ∗8, dimension(:), allocatable **parm::solp_con**
- real ∗8, dimension(:), allocatable **parm::pot_k**
- real ∗8, dimension(:), allocatable **parm::n_reduc**
- real ∗8, dimension(:), allocatable **parm::n_lag**
- real ∗8, dimension(:), allocatable **parm::n_ln**
- real ∗8, dimension(:), allocatable **parm::n_lnco**
- integer, dimension(:), allocatable **parm::ioper**
- integer, dimension(:), allocatable **parm::ngrwat**
- real ∗8, dimension(:), allocatable **parm::filterw**
- real ∗8, dimension(:), allocatable **parm::sumix**
- real ∗8, dimension(:), allocatable **parm::usle_ls**
- real ∗8, dimension(:), allocatable **parm::phuacc**
- real ∗8, dimension(:), allocatable parm::epco

  plant water uptake compensation factor (0-1)
- real ∗8, dimension(:), allocatable parm::esco

  soil evaporation compensation factor (0-1)
- real ∗8, dimension(:), allocatable **parm::slsubbsn**
- real ∗8, dimension(:), allocatable **parm::hru_slp**
- real ∗8, dimension(:), allocatable **parm::erorgn**
- real ∗8, dimension(:), allocatable **parm::erorgp**
- real ∗8, dimension(:), allocatable **parm::biomix**
- real ∗8, dimension(:), allocatable **parm::pnd_seci**
- real ∗8, dimension(:), allocatable **parm::flowmin**
- real ∗8, dimension(:), allocatable **parm::divmax**
- real ∗8, dimension(:), allocatable **parm::canmx**

- real ∗8, dimension(:), allocatable **parm::usle_p**
- real ∗8, dimension(:), allocatable **parm::lat_sed**
- real ∗8, dimension(:), allocatable **parm::rch_dakm**
- real ∗8, dimension(:), allocatable **parm::pnd_no3s**
- real ∗8, dimension(:), allocatable **parm::cn1**
- real ∗8, dimension(:), allocatable **parm::cn2**
- real ∗8, dimension(:), allocatable **parm::lat_ttime**
- real ∗8, dimension(:), allocatable **parm::flowfr**
- real ∗8, dimension(:), allocatable **parm::sol_zmx**
- real ∗8, dimension(:), allocatable **parm::tile_ttime**
- real ∗8, dimension(:), allocatable **parm::slsoil**
- real ∗8, dimension(:), allocatable **parm::sed_stl**
- real ∗8, dimension(:), allocatable **parm::gwminp**
- real ∗8, dimension(:), allocatable **parm::sol_cov**
- real ∗8, dimension(:), allocatable **parm::yldanu**
- real ∗8, dimension(:), allocatable **parm::pnd_solp**
- real ∗8, dimension(:), allocatable **parm::pnd_no3**
- real ∗8, dimension(:), allocatable **parm::ov_n**
- real ∗8, dimension(:), allocatable parm::driftco

  coefficient for pesticide drift directly onto stream (none)
- real ∗8, dimension(:), allocatable **parm::pnd_orgp**
- real ∗8, dimension(:), allocatable **parm::pnd_orgn**
- real ∗8, dimension(:), allocatable **parm::cn3**
- real ∗8, dimension(:), allocatable **parm::twlpnd**
- real ∗8, dimension(:), allocatable **parm::twlwet**
- real ∗8, dimension(:), allocatable **parm::sol_sumul**
- real ∗8, dimension(:), allocatable **parm::pnd_chla**
- real ∗8, dimension(:), allocatable **parm::hru_fr**
- real ∗8, dimension(:), allocatable parm::hru_km

  area of HRU in square kilometers (km^ 2)
- real ∗8, dimension(:), allocatable **parm::bio_ms**
- real ∗8, dimension(:), allocatable **parm::sol_alb**
- real ∗8, dimension(:), allocatable **parm::strsw**
- real ∗8, dimension(:), allocatable **parm::pnd_fr**
- real ∗8, dimension(:), allocatable **parm::pnd_psa**
- real ∗8, dimension(:), allocatable **parm::pnd_pvol**
- real ∗8, dimension(:), allocatable **parm::pnd_k**
- real ∗8, dimension(:), allocatable **parm::pnd_esa**
- real ∗8, dimension(:), allocatable **parm::pnd_evol**
- real ∗8, dimension(:), allocatable **parm::pnd_vol**
- real ∗8, dimension(:), allocatable **parm::yldaa**
- real ∗8, dimension(:), allocatable **parm::pnd_sed**
- real ∗8, dimension(:), allocatable **parm::pnd_nsed**
- real ∗8, dimension(:), allocatable **parm::strsa**
- real ∗8, dimension(:), allocatable **parm::dep_imp**
- real ∗8, dimension(:), allocatable **parm::evpnd**
- real ∗8, dimension(:), allocatable **parm::evwet**
- real ∗8, dimension(:), allocatable **parm::wet_fr**
- real ∗8, dimension(:), allocatable **parm::wet_nsa**
- real ∗8, dimension(:), allocatable **parm::wet_nvol**
- real ∗8, dimension(:), allocatable **parm::wet_k**
- integer, dimension(:), allocatable **parm::iwetgw**
- integer, dimension(:), allocatable **parm::iwetile**
- real ∗8, dimension(:), allocatable **parm::wet_mxsa**

- real ∗8, dimension(:), allocatable **parm::wet_mxvol**
- real ∗8, dimension(:), allocatable **parm::wet_vol**
- real ∗8, dimension(:), allocatable **parm::wet_sed**
- real ∗8, dimension(:), allocatable **parm::wet_nsed**
- real ∗8, dimension(:), allocatable **parm::smx**
- real ∗8, dimension(:), allocatable **parm::sci**
- real ∗8, dimension(:), allocatable **parm::bp1**
- real ∗8, dimension(:), allocatable **parm::bp2**
- real ∗8, dimension(:), allocatable **parm::bw1**
- real ∗8, dimension(:), allocatable **parm::bw2**
- real ∗8, dimension(:), allocatable **parm::bactpq**
- real ∗8, dimension(:), allocatable **parm::bactp_plt**
- real ∗8, dimension(:), allocatable **parm::bactlp_plt**
- real ∗8, dimension(:), allocatable **parm::cnday**
- real ∗8, dimension(:), allocatable **parm::bactlpq**
- real ∗8, dimension(:), allocatable **parm::auto_eff**
- real ∗8, dimension(:), allocatable **parm::sol_sw**
- real ∗8, dimension(:), allocatable **parm::secciw**
- real ∗8, dimension(:), allocatable **parm::bactps**
- real ∗8, dimension(:), allocatable **parm::bactlps**
- real ∗8, dimension(:), allocatable **parm::tmpav**
- real ∗8, dimension(:), allocatable **parm::chlaw**
- real ∗8, dimension(:), allocatable parm::sno_hru

  amount of water stored as snow (mm H2O)
- real ∗8, dimension(:), allocatable **parm::subp**
- real ∗8, dimension(:), allocatable **parm::hru_ra**
- real ∗8, dimension(:), allocatable **parm::wet_orgn**
- real ∗8, dimension(:), allocatable **parm::tmx**
- real ∗8, dimension(:), allocatable **parm::tmn**
- real ∗8, dimension(:), allocatable **parm::rsdin**
- real ∗8, dimension(:), allocatable **parm::tmp_hi**
- real ∗8, dimension(:), allocatable **parm::tmp_lo**
- real ∗8, dimension(:), allocatable **parm::rwt**
- real ∗8, dimension(:), allocatable **parm::olai**
- real ∗8, dimension(:), allocatable **parm::usle_k**
- real ∗8, dimension(:), allocatable **parm::tconc**
- real ∗8, dimension(:), allocatable **parm::hru_rmx**
- real ∗8, dimension(:), allocatable **parm::usle_cfac**
- real ∗8, dimension(:), allocatable **parm::usle_eifac**
- real ∗8, dimension(:), allocatable **parm::anano3**
- real ∗8, dimension(:), allocatable **parm::aird**
- real ∗8, dimension(:), allocatable **parm::t_ov**
- real ∗8, dimension(:), allocatable **parm::sol_sumfc**
- real ∗8, dimension(:), allocatable **parm::sol_avpor**
- real ∗8, dimension(:), allocatable **parm::usle_mult**
- real ∗8, dimension(:), allocatable **parm::wet_orgp**
- real ∗8, dimension(:), allocatable **parm::aairr**
- real ∗8, dimension(:), allocatable **parm::cht**
- real ∗8, dimension(:), allocatable **parm::u10**
- real ∗8, dimension(:), allocatable **parm::rhd**
- real ∗8, dimension(:), allocatable **parm::shallirr**
- real ∗8, dimension(:), allocatable **parm::deepirr**
- real ∗8, dimension(:), allocatable **parm::lai_aamx**
- real ∗8, dimension(:), allocatable parm::ch_l1

longest tributary channel length in subbasin (km)

- real ∗8, dimension(:), allocatable **parm::canstor**
- real ∗8, dimension(:), allocatable **parm::ovrlnd**
- real ∗8, dimension(:), allocatable **parm::wet_no3**
- real ∗8, dimension(:), allocatable **parm::irr_mx**
- real ∗8, dimension(:), allocatable **parm::auto_wstr**
- real ∗8, dimension(:), allocatable **parm::cfrt_id**
- real ∗8, dimension(:), allocatable **parm::cfrt_kg**
- real ∗8, dimension(:), allocatable **parm::cpst_id**
- real ∗8, dimension(:), allocatable **parm::cpst_kg**
- real ∗8, dimension(:), allocatable **parm::irr_asq**
- real ∗8, dimension(:), allocatable **parm::irr_eff**
- real ∗8, dimension(:), allocatable **parm::irrsq**
- real ∗8, dimension(:), allocatable **parm::irrefm**
- real ∗8, dimension(:), allocatable **parm::irrsalt**
- real ∗8, dimension(:), allocatable **parm::bio_eat**
- real ∗8, dimension(:), allocatable **parm::bio_trmp**
- integer, dimension(:), allocatable **parm::ifrt_freq**
- integer, dimension(:), allocatable **parm::ipst_freq**
- integer, dimension(:), allocatable **parm::irr_noa**
- integer, dimension(:), allocatable **parm::irr_sc**
- integer, dimension(:), allocatable **parm::irr_no**
- integer, dimension(:), allocatable **parm::imp_trig**
- integer, dimension(:), allocatable **parm::fert_days**
- integer, dimension(:), allocatable **parm::irr_sca**
- integer, dimension(:), allocatable **parm::pest_days**
- integer, dimension(:), allocatable **parm::idplt**
- integer, dimension(:), allocatable **parm::wstrs_id**
- real ∗8, dimension(:,:), allocatable **parm::bio_aahv**
- real ∗8, dimension(:), allocatable **parm::cumei**
- real ∗8, dimension(:), allocatable **parm::cumeira**
- real ∗8, dimension(:), allocatable **parm::cumrt**
- real ∗8, dimension(:), allocatable **parm::cumrai**
- real ∗8, dimension(:), allocatable **parm::wet_solp**
- real ∗8, dimension(:), allocatable **parm::wet_no3s**
- real ∗8, dimension(:), allocatable **parm::wet_chla**
- real ∗8, dimension(:), allocatable **parm::wet_seci**
- real ∗8, dimension(:), allocatable **parm::pnd_no3g**
- real ∗8, dimension(:), allocatable **parm::pstsol**
- real ∗8, dimension(:), allocatable **parm::gwht**
- real ∗8, dimension(:), allocatable **parm::delay**
- real ∗8, dimension(:), allocatable **parm::gw_q**
- real ∗8, dimension(:), allocatable **parm::pnd_solpg**
- real ∗8, dimension(:), allocatable **parm::alpha_bf**
- real ∗8, dimension(:), allocatable **parm::alpha_bfe**
- real ∗8, dimension(:), allocatable **parm::gw_spyld**
- real ∗8, dimension(:), allocatable **parm::alpha_bf_d**
- real ∗8, dimension(:), allocatable **parm::alpha_bfe_d**
- real ∗8, dimension(:), allocatable **parm::gw_qdeep**
- real ∗8, dimension(:), allocatable **parm::gw_delaye**
- real ∗8, dimension(:), allocatable **parm::gw_revap**
- real ∗8, dimension(:), allocatable **parm::rchrg_dp**
- real ∗8, dimension(:), allocatable parm::anion_excl

fraction of porosity from which anions are excluded

- real ∗8, dimension(:), allocatable **parm::revapmn**
- real ∗8, dimension(:), allocatable **parm::rchrg**
- real ∗8, dimension(:), allocatable **parm::ffc**
- real ∗8, dimension(:), allocatable **parm::bio_min**
- real ∗8, dimension(:), allocatable **parm::surqsolp**
- real ∗8, dimension(:), allocatable **parm::cklsp**
- real ∗8, dimension(:), allocatable **parm::deepst**
- real ∗8, dimension(:), allocatable **parm::shallst**
- real ∗8, dimension(:), allocatable **parm::wet_solpg**
- real ∗8, dimension(:), allocatable **parm::rchrg_src**
- real ∗8, dimension(:), allocatable **parm::wet_no3g**
- real ∗8, dimension(:), allocatable **parm::sol_avbd**
- real ∗8, dimension(:), allocatable **parm::trapeff**
- real ∗8, dimension(:), allocatable **parm::gwqmn**
- real ∗8, dimension(:), allocatable **parm::tdrain**
- real ∗8, dimension(:), allocatable **parm::pplnt**
- real ∗8, dimension(:), allocatable **parm::snotmp**
- real ∗8, dimension(:), allocatable parm::gdrain

  drain tile lag time (hours)
- real ∗8, dimension(:), allocatable **parm::ddrain**
- real ∗8, dimension(:), allocatable **parm::sol_crk**
- real ∗8, dimension(:), allocatable **parm::dayl**
- real ∗8, dimension(:), allocatable **parm::brt**
- real ∗8, dimension(:), allocatable parm::sstmaxd

  static maximum depressional storage; read from .sdr (mm)
- real ∗8, dimension(:), allocatable **parm::ddrain_hru**
- real ∗8, dimension(:), allocatable **parm::re**
- real ∗8, dimension(:), allocatable **parm::sdrain**
- real ∗8, dimension(:), allocatable **parm::stmaxd**
- real ∗8, dimension(:), allocatable **parm::drain_co**
- real ∗8, dimension(:), allocatable **parm::pc**
- real ∗8, dimension(:), allocatable **parm::latksatf**
- real ∗8, dimension(:), allocatable **parm::twash**
- real ∗8, dimension(:), allocatable **parm::rnd2**
- real ∗8, dimension(:), allocatable **parm::rnd3**
- real ∗8, dimension(:), allocatable **parm::sol_cnsw**
- real ∗8, dimension(:), allocatable **parm::doxq**
- real ∗8, dimension(:), allocatable **parm::rnd8**
- real ∗8, dimension(:), allocatable **parm::rnd9**
- real ∗8, dimension(:), allocatable **parm::percn**
- real ∗8, dimension(:), allocatable **parm::sol_sumwp**
- real ∗8, dimension(:), allocatable **parm::tauton**
- real ∗8, dimension(:), allocatable **parm::tautop**
- real ∗8, dimension(:), allocatable **parm::cbodu**
- real ∗8, dimension(:), allocatable **parm::chl_a**
- real ∗8, dimension(:), allocatable **parm::qdr**
- real ∗8, dimension(:), allocatable **parm::tfertn**
- real ∗8, dimension(:), allocatable **parm::tfertp**
- real ∗8, dimension(:), allocatable **parm::tgrazn**
- real ∗8, dimension(:), allocatable **parm::tgrazp**
- real ∗8, dimension(:), allocatable **parm::latno3**
- real ∗8, dimension(:), allocatable **parm::latq**
- real ∗8, dimension(:), allocatable **parm::minpgw**
- real ∗8, dimension(:), allocatable **parm::no3gw**

- real ∗8, dimension(:), allocatable **parm::nplnt**
- real ∗8, dimension(:), allocatable **parm::tileq**
- real ∗8, dimension(:), allocatable **parm::tileno3**
- real ∗8, dimension(:), allocatable **parm::sedminpa**
- real ∗8, dimension(:), allocatable **parm::sedminps**
- real ∗8, dimension(:), allocatable **parm::sedorgn**
- real ∗8, dimension(:), allocatable **parm::sedorgp**
- real ∗8, dimension(:), allocatable **parm::sedyld**
- real ∗8, dimension(:), allocatable **parm::sepbtm**
- real ∗8, dimension(:), allocatable **parm::strsn**
- real ∗8, dimension(:), allocatable **parm::strsp**
- real ∗8, dimension(:), allocatable **parm::strstmp**
- real ∗8, dimension(:), allocatable **parm::surfq**
- real ∗8, dimension(:), allocatable **parm::surqno3**
- real ∗8, dimension(:), allocatable **parm::tcfrtn**
- real ∗8, dimension(:), allocatable **parm::tcfrtp**
- real ∗8, dimension(:), allocatable **parm::hru_ha**
- real ∗8, dimension(:), allocatable **parm::hru_dafr**
- real ∗8, dimension(:), allocatable **parm::drydep_no3**
- real ∗8, dimension(:), allocatable **parm::drydep_nh4**
- real ∗8, dimension(:), allocatable **parm::phubase**
- real ∗8, dimension(:), allocatable **parm::bio_yrms**
- real ∗8, dimension(:), allocatable **parm::hvstiadj**
- real ∗8, dimension(:), allocatable **parm::laimxfr**
- real ∗8, dimension(:), allocatable **parm::laiday**
- real ∗8, dimension(:), allocatable **parm::chlap**
- real ∗8, dimension(:), allocatable **parm::pnd_psed**
- real ∗8, dimension(:), allocatable **parm::wet_psed**
- real ∗8, dimension(:), allocatable **parm::seccip**
- real ∗8, dimension(:), allocatable **parm::plantn**
- real ∗8, dimension(:), allocatable **parm::plt_et**
- real ∗8, dimension(:), allocatable **parm::plt_pet**
- real ∗8, dimension(:), allocatable **parm::plantp**
- real ∗8, dimension(:), allocatable **parm::bio_aams**
- real ∗8, dimension(:), allocatable **parm::bio_aamx**
- real ∗8, dimension(:), allocatable **parm::lai_yrmx**
- real ∗8, dimension(:), allocatable **parm::dormhr**
- real ∗8, dimension(:), allocatable **parm::lat_pst**
- real ∗8, dimension(:), allocatable **parm::orig_snohru**
- real ∗8, dimension(:), allocatable **parm::orig_potvol**
- real ∗8, dimension(:), allocatable **parm::fld_fr**
- real ∗8, dimension(:), allocatable **parm::orig_alai**
- real ∗8, dimension(:), allocatable **parm::orig_bioms**
- real ∗8, dimension(:), allocatable **parm::pltfr_n**
- real ∗8, dimension(:), allocatable **parm::orig_phuacc**
- real ∗8, dimension(:), allocatable **parm::orig_sumix**
- real ∗8, dimension(:), allocatable **parm::pltfr_p**
- real ∗8, dimension(:), allocatable **parm::orig_phu**
- real ∗8, dimension(:), allocatable **parm::phu_plt**
- real ∗8, dimension(:), allocatable **parm::orig_shallst**
- real ∗8, dimension(:), allocatable **parm::orig_deepst**
- real ∗8, dimension(:), allocatable **parm::orig_pndvol**
- real ∗8, dimension(:), allocatable **parm::orig_pndsed**
- real ∗8, dimension(:), allocatable **parm::rip_fr**
- real ∗8, dimension(:), allocatable **parm::orig_pndno3**

- real ∗8, dimension(:), allocatable **parm::orig_pndsolp**
- real ∗8, dimension(:), allocatable **parm::orig_pndorgn**
- real ∗8, dimension(:), allocatable **parm::orig_pndorgp**
- real ∗8, dimension(:), allocatable **parm::orig_wetvol**
- real ∗8, dimension(:), allocatable **parm::orig_wetsed**
- real ∗8, dimension(:), allocatable **parm::orig_wetno3**
- real ∗8, dimension(:), allocatable **parm::orig_wetsolp**
- real ∗8, dimension(:), allocatable **parm::orig_wetorgn**
- real ∗8, dimension(:), allocatable **parm::orig_wetorgp**
- real ∗8, dimension(:), allocatable **parm::orig_solcov**
- real ∗8, dimension(:), allocatable **parm::orig_solsw**
- real ∗8, dimension(:), allocatable **parm::orig_potno3**
- real ∗8, dimension(:), allocatable **parm::orig_potsed**
- real ∗8, dimension(:), allocatable **parm::wtab**
- real ∗8, dimension(:), allocatable **parm::wtab_mn**
- real ∗8, dimension(:), allocatable **parm::wtab_mx**
- real ∗8, dimension(:), allocatable **parm::shallst_n**
- real ∗8, dimension(:), allocatable **parm::gw_nloss**
- real ∗8, dimension(:), allocatable **parm::rchrg_n**
- real ∗8, dimension(:), allocatable **parm::det_san**
- real ∗8, dimension(:), allocatable **parm::det_sil**
- real ∗8, dimension(:), allocatable **parm::det_cla**
- real ∗8, dimension(:), allocatable **parm::det_sag**
- real ∗8, dimension(:), allocatable **parm::det_lag**
- real ∗8, dimension(:), allocatable **parm::tnylda**
- real ∗8, dimension(:), allocatable **parm::afrt_surface**
- real ∗8 **parm::frt_surface**
- real ∗8, dimension(:), allocatable **parm::auto_nyr**
- real ∗8, dimension(:), allocatable **parm::auto_napp**
- real ∗8, dimension(:), allocatable **parm::manure_kg**
- real ∗8, dimension(:), allocatable **parm::auto_nstrs**
- real ∗8, dimension(:,:), allocatable **parm::rcn_mo**
- real ∗8, dimension(:,:), allocatable **parm::rammo_mo**
- real ∗8, dimension(:,:), allocatable **parm::drydep_no3_mo**
- real ∗8, dimension(:,:), allocatable **parm::drydep_nh4_mo**
- real ∗8, dimension(:), allocatable **parm::rcn_d**
- real ∗8, dimension(:), allocatable **parm::rammo_d**
- real ∗8, dimension(:), allocatable **parm::drydep_no3_d**
- real ∗8, dimension(:), allocatable **parm::drydep_nh4_d**
- real ∗8, dimension(:,:), allocatable **parm::yldn**
- real ∗8, dimension(:,:), allocatable **parm::gwati**
- real ∗8, dimension(:,:), allocatable **parm::gwatn**
- real ∗8, dimension(:,:), allocatable **parm::gwatl**
- real ∗8, dimension(:,:), allocatable **parm::gwatw**
- real ∗8, dimension(:,:), allocatable **parm::gwatd**
- real ∗8, dimension(:,:), allocatable **parm::gwatveg**
- real ∗8, dimension(:,:), allocatable **parm::gwata**
- real ∗8, dimension(:,:), allocatable **parm::gwats**
- real ∗8, dimension(:,:), allocatable **parm::gwatspcon**
- real ∗8, dimension(:,:), allocatable **parm::rfqeo_30d**
- real ∗8, dimension(:,:), allocatable **parm::eo_30d**
- real ∗8, dimension(:,:), allocatable **parm::wgncur**
- real ∗8, dimension(:,:), allocatable **parm::wgnold**
- real ∗8, dimension(:,:), allocatable **parm::wrt**
- real ∗8, dimension(:,:), allocatable **parm::psetlp**

- real ∗8, dimension(:,:), allocatable **parm::zdb**
- real ∗8, dimension(:,:), allocatable **parm::pst_surq**
- real ∗8, dimension(:,:), allocatable **parm::pst_enr**
- real ∗8, dimension(:,:), allocatable **parm::plt_pst**
- real ∗8, dimension(:,:), allocatable **parm::pst_sed**
- real ∗8, dimension(:,:), allocatable **parm::psetlw**
- real ∗8, dimension(:,:), allocatable **parm::pcpband**
- real ∗8, dimension(:,:), allocatable **parm::wupnd**
- real ∗8, dimension(:,:), allocatable **parm::tavband**
- real ∗8, dimension(:,:), allocatable **parm::phi**
- real ∗8, dimension(:,:), allocatable **parm::wat_phi**
- real ∗8, dimension(:,:), allocatable parm::snoeb

  initial snow water content in elevation band (mm H2O)
- real ∗8, dimension(:,:), allocatable **parm::wushal**
- real ∗8, dimension(:,:), allocatable **parm::wudeep**
- real ∗8, dimension(:,:), allocatable **parm::tmnband**
- real ∗8, dimension(:,:), allocatable **parm::nsetlw**
- real ∗8, dimension(:,:), allocatable **parm::snotmpeb**
- real ∗8, dimension(:,:), allocatable **parm::bss**
- real ∗8, dimension(:,:), allocatable **parm::surf_bs**
- real ∗8, dimension(:,:), allocatable **parm::tmxband**
- real ∗8, dimension(:,:), allocatable **parm::nsetlp**
- real ∗8, dimension(:,:), allocatable **parm::rainsub**
- real ∗8, dimension(:,:), allocatable **parm::frad**
- real ∗8, dimension(:), allocatable **parm::rstpbsb**
- real ∗8, dimension(:,:), allocatable **parm::orig_snoeb**
- real ∗8, dimension(:,:), allocatable **parm::orig_pltpst**
- real ∗8, dimension(:,:), allocatable **parm::terr_p**
- real ∗8, dimension(:,:), allocatable **parm::terr_cn**
- real ∗8, dimension(:,:), allocatable **parm::terr_sl**
- real ∗8, dimension(:,:), allocatable **parm::drain_d**
- real ∗8, dimension(:,:), allocatable **parm::drain_t**
- real ∗8, dimension(:,:), allocatable **parm::drain_g**
- real ∗8, dimension(:,:), allocatable **parm::drain_idep**
- real ∗8, dimension(:,:), allocatable **parm::cont_cn**
- real ∗8, dimension(:,:), allocatable **parm::cont_p**
- real ∗8, dimension(:,:), allocatable **parm::filt_w**
- real ∗8, dimension(:,:), allocatable **parm::strip_n**
- real ∗8, dimension(:,:), allocatable **parm::strip_cn**
- real ∗8, dimension(:,:), allocatable **parm::strip_c**
- real ∗8, dimension(:,:), allocatable **parm::strip_p**
- real ∗8, dimension(:,:), allocatable **parm::fire_cn**
- real ∗8, dimension(:,:), allocatable **parm::cropno_upd**
- real ∗8, dimension(:,:), allocatable **parm::hi_upd**
- real ∗8, dimension(:,:), allocatable **parm::laimx_upd**
- real ∗8, dimension(:,:,:), allocatable **parm::pst_lag**
- real ∗8, dimension(:,:,:), allocatable **parm::phug**
- integer, dimension(:), allocatable **parm::nrelease**
- integer, dimension(:), allocatable **parm::swtrg**
- integer, dimension(:), allocatable **parm::hrupest**
- integer, dimension(:), allocatable **parm::nro**
- integer, dimension(:), allocatable **parm::nrot**
- integer, dimension(:), allocatable **parm::nfert**
- integer, dimension(:), allocatable **parm::igro**

- integer, dimension(:), allocatable **parm::nair**
- integer, dimension(:), allocatable **parm::ipnd1**
- integer, dimension(:), allocatable **parm::ipnd2**
- integer, dimension(:), allocatable **parm::nirr**
- integer, dimension(:), allocatable **parm::iflod1**
- integer, dimension(:), allocatable **parm::iflod2**
- integer, dimension(:), allocatable **parm::ndtarg**
- integer, dimension(:), allocatable **parm::iafrttyp**
- integer, dimension(:), allocatable **parm::nstress**
- integer, dimension(:), allocatable **parm::igrotree**
- integer, dimension(:), allocatable **parm::grz_days**
- integer, dimension(:), allocatable **parm::nmgt**
- integer, dimension(:), allocatable **parm::icr**
- integer, dimension(:), allocatable **parm::ncut**
- integer, dimension(:), allocatable **parm::nsweep**
- integer, dimension(:), allocatable **parm::nafert**
- integer, dimension(:), allocatable **parm::irn**
- integer, dimension(:), allocatable **parm::irrno**
- integer, dimension(:), allocatable **parm::sol_nly**
- integer, dimension(:), allocatable **parm::npcp**
- integer, dimension(:), allocatable **parm::igrz**
- integer, dimension(:), allocatable **parm::ndeat**
- integer, dimension(:), allocatable **parm::ngr**
- integer, dimension(:), allocatable **parm::ncf**
- integer, dimension(:), allocatable parm::hru_sub

  subbasin in which HRU is located (none)
- integer, dimension(:), allocatable **parm::idorm**
- integer, dimension(:), allocatable **parm::urblu**
- integer, dimension(:), allocatable **parm::ldrain**
- integer, dimension(:), allocatable **parm::hru_seq**
- integer, dimension(:), allocatable **parm::iurban**
- integer, dimension(:), allocatable **parm::iday_fert**
- integer, dimension(:), allocatable **parm::icfrt**
- integer, dimension(:), allocatable parm::ifld

  number of HRU (in subbasin) that is a floodplain (none)
- integer, dimension(:), allocatable parm::irip

  number of HRU (in subbasin) that is a riparian zone (none)
- integer, dimension(:), allocatable **parm::ndcfrt**
- integer, dimension(:), allocatable **parm::hrugis**
- integer, dimension(:), allocatable **parm::orig_igro**
- integer, dimension(:), allocatable **parm::ntil**
- integer, dimension(:), allocatable **parm::irrsc**
- integer, dimension(:), allocatable **parm::iwatable**
- integer, dimension(:), allocatable **parm::curyr_mat**
- integer, dimension(:), allocatable **parm::ncpest**
- integer, dimension(:), allocatable **parm::icpst**
- integer, dimension(:), allocatable **parm::ndcpst**
- integer, dimension(:), allocatable **parm::iday_pest**
- integer, dimension(:), allocatable **parm::irr_flag**
- integer, dimension(:), allocatable **parm::irra_flag**
- integer, dimension(:,:), allocatable parm::rndseed

random number generator seed. The seeds in the array are used to generate random numbers for the following purposes:
(1) wet/dry day probability
(2) solar radiation
(3) precipitation
(4) USLE rainfall erosion index
(5) wind speed
(6) 0.5 hr rainfall fraction
(7) relative humidity
(8) maximum temperature
(9) minimum temperature
(10) generate new random numbers

- integer, dimension(:,:), allocatable **parm::iterr**
- integer, dimension(:,:), allocatable **parm::iyterr**
- integer, dimension(:,:), allocatable **parm::itdrain**
- integer, dimension(:,:), allocatable **parm::iydrain**
- integer, dimension(:,:), allocatable **parm::ncrops**
- integer, dimension(:), allocatable **parm::manure_id**
- integer, dimension(:,:), allocatable **parm::mgt_sdr**
- integer, dimension(:,:), allocatable **parm::idplrot**
- integer, dimension(:,:), allocatable **parm::icont**
- integer, dimension(:,:), allocatable **parm::iycont**
- integer, dimension(:,:), allocatable **parm::ifilt**
- integer, dimension(:,:), allocatable **parm::iyfilt**
- integer, dimension(:,:), allocatable **parm::istrip**
- integer, dimension(:,:), allocatable **parm::iystrip**
- integer, dimension(:,:), allocatable **parm::iopday**
- integer, dimension(:,:), allocatable **parm::iopyr**
- integer, dimension(:,:), allocatable **parm::mgt_ops**
- real ∗8, dimension(:), allocatable **parm::wshd_pstap**
- real ∗8, dimension(:), allocatable **parm::wshd_pstdg**
- integer, dimension(12) **parm::ndmo**
- integer, dimension(:), allocatable **parm::npno**
- integer, dimension(:), allocatable **parm::mcrhru**
- character(len=13), dimension(18) parm::rfile

  rainfall file names (.pcp)
- character(len=13), dimension(18) parm::tfile

  temperature file names (.tmp)
- character(len=4), dimension(1000) parm::urbname

  name of urban land use
- character(len=1), dimension(:), allocatable **parm::hydgrp**
- character(len=1), dimension(:), allocatable **parm::kirr**
- character(len=16), dimension(:), allocatable **parm::snam**
- character(len=17), dimension(300) parm::pname

  name of pesticide/toxin adding qtile to output.hru write 3/2/2010 gsm increased heds(70) to heds(71)
- character(len=13), dimension(79) **parm::heds**
- character(len=13), dimension(24) **parm::hedb**
- character(len=13), dimension(46) **parm::hedr**
- character(len=13), dimension(41) **parm::hedrsv**
- character(len=13), dimension(40) **parm::hedwtr**
- character(len=4), dimension(60) parm::title

  description lines in file.cio (1st 3 lines)
- character(len=4), dimension(5000) parm::cpnm

  four character code to represent crop name
- character(len=17), dimension(50) **parm::fname**

- real ∗8, dimension(:,:,:), allocatable **parm::flomon**
- real ∗8, dimension(:,:,:), allocatable **parm::solpstmon**
- real ∗8, dimension(:,:,:), allocatable **parm::srbpstmon**
- real ∗8, dimension(:,:,:), allocatable **parm::sedmon**
- real ∗8, dimension(:,:,:), allocatable **parm::orgnmon**
- real ∗8, dimension(:,:,:), allocatable **parm::orgpmon**
- real ∗8, dimension(:,:,:), allocatable **parm::no3mon**
- real ∗8, dimension(:,:,:), allocatable **parm::minpmon**
- real ∗8, dimension(:,:,:), allocatable **parm::nh3mon**
- real ∗8, dimension(:,:,:), allocatable **parm::no2mon**
- real ∗8, dimension(:,:,:), allocatable **parm::bactpmon**
- real ∗8, dimension(:,:,:), allocatable **parm::bactlpmon**
- real ∗8, dimension(:,:,:), allocatable **parm::cmtl1mon**
- real ∗8, dimension(:,:,:), allocatable **parm::cmtl2mon**
- real ∗8, dimension(:,:,:), allocatable **parm::cmtl3mon**
- real ∗8, dimension(:,:,:), allocatable **parm::chlamon**
- real ∗8, dimension(:,:,:), allocatable **parm::disoxmon**
- real ∗8, dimension(:,:,:), allocatable **parm::cbodmon**
- real ∗8, dimension(:,:), allocatable **parm::floyr**
- real ∗8, dimension(:,:), allocatable **parm::sedyr**
- real ∗8, dimension(:,:), allocatable **parm::orgnyr**
- real ∗8, dimension(:,:), allocatable **parm::orgpyr**
- real ∗8, dimension(:,:), allocatable **parm::no3yr**
- real ∗8, dimension(:,:), allocatable **parm::minpyr**
- real ∗8, dimension(:,:), allocatable **parm::nh3yr**
- real ∗8, dimension(:,:), allocatable **parm::no2yr**
- real ∗8, dimension(:,:), allocatable **parm::bactpyr**
- real ∗8, dimension(:,:), allocatable **parm::bactlpyr**
- real ∗8, dimension(:,:), allocatable **parm::cmtl1yr**
- real ∗8, dimension(:,:), allocatable **parm::cmtl2yr**
- real ∗8, dimension(:,:), allocatable **parm::cmtl3yr**
- real ∗8, dimension(:,:), allocatable **parm::chlayr**
- real ∗8, dimension(:,:), allocatable **parm::disoxyr**
- real ∗8, dimension(:,:), allocatable **parm::cbodyr**
- real ∗8, dimension(:,:), allocatable **parm::solpstyr**
- real ∗8, dimension(:,:), allocatable **parm::srbpstyr**
- real ∗8, dimension(:,:), allocatable **parm::sol_mc**
- real ∗8, dimension(:,:), allocatable **parm::sol_mn**
- real ∗8, dimension(:,:), allocatable **parm::sol_mp**
- real ∗8, dimension(:), allocatable **parm::flocnst**
- real ∗8, dimension(:), allocatable **parm::sedcnst**
- real ∗8, dimension(:), allocatable **parm::orgncnst**
- real ∗8, dimension(:), allocatable **parm::orgpcnst**
- real ∗8, dimension(:), allocatable **parm::no3cnst**
- real ∗8, dimension(:), allocatable **parm::minpcnst**
- real ∗8, dimension(:), allocatable **parm::nh3cnst**
- real ∗8, dimension(:), allocatable **parm::no2cnst**
- real ∗8, dimension(:), allocatable **parm::bactpcnst**
- real ∗8, dimension(:), allocatable **parm::cmtl1cnst**
- real ∗8, dimension(:), allocatable **parm::cmtl2cnst**
- real ∗8, dimension(:), allocatable **parm::bactlpcnst**
- real ∗8, dimension(:), allocatable **parm::cmtl3cnst**
- real ∗8, dimension(:), allocatable **parm::chlacnst**
- real ∗8, dimension(:), allocatable **parm::disoxcnst**
- real ∗8, dimension(:), allocatable **parm::cbodcnst**

- real ∗8, dimension(:), allocatable **parm::solpstcnst**
- real ∗8, dimension(:), allocatable **parm::srbpstcnst**
- integer parm::nstep

  max number of time steps per day
- integer parm::idt

  length of time step used to report precipitation data for sub-daily modeling (minutes)
- real ∗8, dimension(:), allocatable **parm::hrtwtr**
- real ∗8, dimension(:), allocatable **parm::hhstor**
- real ∗8, dimension(:), allocatable **parm::hdepth**
- real ∗8, dimension(:), allocatable **parm::hsdti**
- real ∗8, dimension(:), allocatable **parm::hrchwtr**
- real ∗8, dimension(:), allocatable **parm::halgae**
- real ∗8, dimension(:), allocatable **parm::horgn**
- real ∗8, dimension(:), allocatable **parm::hnh4**
- real ∗8, dimension(:), allocatable **parm::hno2**
- real ∗8, dimension(:), allocatable **parm::hno3**
- real ∗8, dimension(:), allocatable **parm::horgp**
- real ∗8, dimension(:), allocatable **parm::hsolp**
- real ∗8, dimension(:), allocatable **parm::hbod**
- real ∗8, dimension(:), allocatable **parm::hdisox**
- real ∗8, dimension(:), allocatable **parm::hchla**
- real ∗8, dimension(:), allocatable **parm::hsedyld**
- real ∗8, dimension(:), allocatable **parm::hsedst**
- real ∗8, dimension(:), allocatable **parm::hharea**
- real ∗8, dimension(:), allocatable **parm::hsolpst**
- real ∗8, dimension(:), allocatable **parm::hsorpst**
- real ∗8, dimension(:), allocatable **parm::hhqday**
- real ∗8, dimension(:), allocatable **parm::precipdt**
- real ∗8, dimension(:), allocatable **parm::hhtime**
- real ∗8, dimension(:), allocatable **parm::hbactp**
- real ∗8, dimension(:), allocatable **parm::hbactlp**
- integer, dimension(10) **parm::ivar_orig**
- real ∗8, dimension(10) **parm::rvar_orig**
- integer parm::nsave

  number of save commands in .fig file
- integer **parm::nauto**
- integer **parm::iatmodep**
- real ∗8, dimension(:), allocatable **parm::wattemp**
- real ∗8, dimension(:), allocatable **parm::lkpst_mass**
- real ∗8, dimension(:), allocatable **parm::lkspst_mass**
- real ∗8, dimension(:), allocatable **parm::vel_chan**
- real ∗8, dimension(:), allocatable **parm::vfscon**
- real ∗8, dimension(:), allocatable **parm::vfsratio**
- real ∗8, dimension(:), allocatable **parm::vfsch**
- real ∗8, dimension(:), allocatable **parm::vfsi**
- real ∗8, dimension(:,:), allocatable **parm::filter_i**
- real ∗8, dimension(:,:), allocatable **parm::filter_ratio**
- real ∗8, dimension(:,:), allocatable **parm::filter_con**
- real ∗8, dimension(:,:), allocatable **parm::filter_ch**
- real ∗8, dimension(:,:), allocatable **parm::sol_n**
- integer parm::cswat

  = 0 Static soil carbon (old mineralization routines)
  = 1 C-FARM one carbon pool model
  = 2 Century model

- real ∗8, dimension(:,:), allocatable **parm::sol_bdp**
- real ∗8, dimension(:,:), allocatable **parm::tillagef**
- real ∗8, dimension(:), allocatable **parm::rtfr**
- real ∗8, dimension(:), allocatable **parm::stsol_rd**
- integer **parm::urban_flag**
- integer **parm::dorm_flag**
- real ∗8 **parm::bf_flg**
- real ∗8 **parm::iabstr**
- real ∗8, dimension(:), allocatable **parm::ubnrunoff**
- real ∗8, dimension(:), allocatable **parm::ubntss**
- real ∗8, dimension(:,:), allocatable **parm::sub_ubnrunoff**
- real ∗8, dimension(:,:), allocatable **parm::sub_ubntss**
- real ∗8, dimension(:,:), allocatable **parm::ovrlnd_dt**
- real ∗8, dimension(:,:,:), allocatable **parm::hhsurf_bs**
- integer parm::iuh

  unit hydrograph method: 1=triangular UH; 2=gamma funtion UH;
- integer parm::sed_ch

  channel routing for HOURLY; 0=Bagnold; 2=Brownlie; 3=Yang;
- real ∗8 parm::eros_expo

  an exponent in the overland flow erosion equation ranges 1.5-3.0
- real ∗8 parm::eros_spl

  coefficient of splash erosion varing 0.9-3.1
- real ∗8 parm::rill_mult

  Multiplier to USLE_K for soil susceptible to rill erosion, range 0.5-2.0.
- real ∗8 **parm::sedprev**
- real ∗8 **parm::c_factor**
- real ∗8 parm::ch_d50

  median particle diameter of channel bed (mm)
- real ∗8 parm::sig_g

  geometric standard deviation of particle sizes for the main channel. Mean air temperature at which precipitation is equally likely to be rain as snow/freezing rain.
- real ∗8 parm::uhalpha

  alpha coefficient for estimating unit hydrograph using a gamma function (∗.bsn)
- real ∗8 **parm::abstinit**
- real ∗8 **parm::abstmax**
- real ∗8, dimension(:,:), allocatable **parm::hhsedy**
- real ∗8, dimension(:,:), allocatable **parm::sub_subp_dt**
- real ∗8, dimension(:,:), allocatable **parm::sub_hhsedy**
- real ∗8, dimension(:,:), allocatable **parm::sub_atmp**
- real ∗8, dimension(:), allocatable **parm::rhy**
- real ∗8, dimension(:), allocatable **parm::init_abstrc**
- real ∗8, dimension(:), allocatable **parm::dratio**
- real ∗8, dimension(:), allocatable **parm::hrtevp**
- real ∗8, dimension(:), allocatable **parm::hrttlc**
- real ∗8, dimension(:,:,:), allocatable **parm::rchhr**
- real ∗8, dimension(:), allocatable **parm::hhresflwi**
- real ∗8, dimension(:), allocatable **parm::hhresflwo**
- real ∗8, dimension(:), allocatable **parm::hhressedi**
- real ∗8, dimension(:), allocatable **parm::hhressedo**
- character(len=4), dimension(:), allocatable **parm::lu_nodrain**
- integer, dimension(:), allocatable **parm::bmpdrain**
- real ∗8, dimension(:), allocatable **parm::sub_cn2**
- real ∗8, dimension(:), allocatable **parm::sub_ha_urb**

- real ∗8, dimension(:), allocatable **parm::bmp_recharge**
- real ∗8, dimension(:), allocatable **parm::sub_ha_imp**
- real ∗8, dimension(:), allocatable **parm::subdr_km**
- real ∗8, dimension(:), allocatable **parm::subdr_ickm**
- real ∗8, dimension(:,:), allocatable **parm::sf_im**
- real ∗8, dimension(:,:), allocatable **parm::sf_iy**
- real ∗8, dimension(:,:), allocatable **parm::sp_sa**
- real ∗8, dimension(:,:), allocatable **parm::sp_pvol**
- real ∗8, dimension(:,:), allocatable **parm::sp_pd**
- real ∗8, dimension(:,:), allocatable **parm::sp_sedi**
- real ∗8, dimension(:,:), allocatable **parm::sp_sede**
- real ∗8, dimension(:,:), allocatable **parm::ft_sa**
- real ∗8, dimension(:,:), allocatable **parm::ft_fsa**
- real ∗8, dimension(:,:), allocatable **parm::ft_dep**
- real ∗8, dimension(:,:), allocatable **parm::ft_h**
- real ∗8, dimension(:,:), allocatable **parm::ft_pd**
- real ∗8, dimension(:,:), allocatable **parm::ft_k**
- real ∗8, dimension(:,:), allocatable **parm::ft_dp**
- real ∗8, dimension(:,:), allocatable **parm::ft_dc**
- real ∗8, dimension(:,:), allocatable **parm::ft_por**
- real ∗8, dimension(:,:), allocatable **parm::tss_den**
- real ∗8, dimension(:,:), allocatable **parm::ft_alp**
- real ∗8, dimension(:,:), allocatable **parm::sf_fr**
- real ∗8, dimension(:,:), allocatable **parm::sp_qi**
- real ∗8, dimension(:,:), allocatable **parm::sp_k**
- real ∗8, dimension(:,:), allocatable **parm::ft_qpnd**
- real ∗8, dimension(:,:), allocatable **parm::sp_dp**
- real ∗8, dimension(:,:), allocatable **parm::ft_qsw**
- real ∗8, dimension(:,:), allocatable **parm::ft_qin**
- real ∗8, dimension(:,:), allocatable **parm::ft_qout**
- real ∗8, dimension(:,:), allocatable **parm::ft_sedpnd**
- real ∗8, dimension(:,:), allocatable **parm::sp_bpw**
- real ∗8, dimension(:,:), allocatable **parm::ft_bpw**
- real ∗8, dimension(:,:), allocatable **parm::ft_sed_cumul**
- real ∗8, dimension(:,:), allocatable **parm::sp_sed_cumul**
- integer, dimension(:), allocatable **parm::num_sf**
- integer, dimension(:,:), allocatable **parm::sf_typ**
- integer, dimension(:,:), allocatable **parm::sf_dim**
- integer, dimension(:,:), allocatable **parm::ft_qfg**
- integer, dimension(:,:), allocatable **parm::sp_qfg**
- integer, dimension(:,:), allocatable **parm::sf_ptp**
- integer, dimension(:,:), allocatable **parm::ft_fc**
- real ∗8 **parm::sfsedmean**
- real ∗8 **parm::sfsedstdev**
- integer, dimension(:), allocatable **parm::dtp_subnum**
- integer, dimension(:), allocatable **parm::dtp_imo**
- integer, dimension(:), allocatable **parm::dtp_iyr**
- integer, dimension(:), allocatable **parm::dtp_numweir**
- integer, dimension(:), allocatable **parm::dtp_numstage**
- integer, dimension(:), allocatable **parm::dtp_stagdis**
- integer, dimension(:), allocatable **parm::dtp_reltype**
- integer, dimension(:), allocatable **parm::dtp_onoff**
- real ∗8, dimension(:), allocatable **parm::cf**
- real ∗8, dimension(:), allocatable **parm::cfh**
- real ∗8, dimension(:), allocatable **parm::cfdec**

- real ∗8, dimension(:), allocatable **parm::lat_orgn**
- real ∗8, dimension(:), allocatable **parm::lat_orgp**
- integer, dimension(:,:), allocatable **parm::dtp_weirtype**
- integer, dimension(:,:), allocatable **parm::dtp_weirdim**
- real ∗8, dimension(:), allocatable **parm::dtp_evrsv**
- real ∗8, dimension(:), allocatable **parm::dtp_inflvol**
- real ∗8, dimension(:), allocatable **parm::dtp_totwrwid**
- real ∗8, dimension(:), allocatable **parm::dtp_lwratio**
- real ∗8, dimension(:), allocatable **parm::dtp_wdep**
- real ∗8, dimension(:), allocatable **parm::dtp_totdep**
- real ∗8, dimension(:), allocatable **parm::dtp_watdepact**
- real ∗8, dimension(:), allocatable **parm::dtp_outflow**
- real ∗8, dimension(:), allocatable **parm::dtp_totrel**
- real ∗8, dimension(:), allocatable **parm::dtp_backoff**
- real ∗8, dimension(:), allocatable **parm::dtp_seep_sa**
- real ∗8, dimension(:), allocatable **parm::dtp_evap_sa**
- real ∗8, dimension(:), allocatable **parm::dtp_pet_day**
- real ∗8, dimension(:), allocatable **parm::dtp_pcpvol**
- real ∗8, dimension(:), allocatable **parm::dtp_seepvol**
- real ∗8, dimension(:), allocatable **parm::dtp_evapvol**
- real ∗8, dimension(:), allocatable **parm::dtp_flowin**
- real ∗8, dimension(:), allocatable **parm::dtp_backup_length**
- real ∗8, dimension(:), allocatable **parm::dtp_intcept**
- real ∗8, dimension(:), allocatable **parm::dtp_expont**
- real ∗8, dimension(:), allocatable **parm::dtp_coef1**
- real ∗8, dimension(:), allocatable **parm::dtp_coef2**
- real ∗8, dimension(:), allocatable **parm::dtp_coef3**
- real ∗8, dimension(:), allocatable **parm::dtp_dummy1**
- real ∗8, dimension(:), allocatable **parm::dtp_dummy2**
- real ∗8, dimension(:), allocatable **parm::dtp_dummy3**
- real ∗8, dimension(:), allocatable **parm::dtp_ivol**
- real ∗8, dimension(:), allocatable **parm::dtp_ised**
- integer, dimension(:,:), allocatable **parm::so_res_flag**
- integer, dimension(:,:), allocatable **parm::ro_bmp_flag**
- real ∗8, dimension(:,:), allocatable **parm::sol_watp**
- real ∗8, dimension(:,:), allocatable **parm::sol_solp_pre**
- real ∗8, dimension(:,:), allocatable **parm::psp_store**
- real ∗8, dimension(:,:), allocatable **parm::ssp_store**
- real ∗8, dimension(:,:), allocatable **parm::so_res**
- real ∗8, dimension(:,:), allocatable **parm::sol_cal**
- real ∗8, dimension(:,:), allocatable **parm::sol_ph**
- integer **parm::sol_p_model**
- integer, dimension(:,:), allocatable **parm::a_days**
- integer, dimension(:,:), allocatable **parm::b_days**
- real ∗8, dimension(:), allocatable **parm::harv_min**
- real ∗8, dimension(:), allocatable **parm::fstap**
- real ∗8, dimension(:), allocatable **parm::min_res**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_flo**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_sed**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_bac**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_pp**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_sp**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_pn**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_sn**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_flos**

- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_seds**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_bacs**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_pps**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_sps**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_pns**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_sns**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_flot**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_sedt**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_bact**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_ppt**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_spt**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_pnt**
- real ∗8, dimension(:,:), allocatable **parm::ro_bmp_snt**
- real ∗8, dimension(:), allocatable **parm::bmp_flo**
- real ∗8, dimension(:), allocatable **parm::bmp_sed**
- real ∗8, dimension(:), allocatable **parm::bmp_bac**
- real ∗8, dimension(:), allocatable **parm::bmp_pp**
- real ∗8, dimension(:), allocatable **parm::bmp_sp**
- real ∗8, dimension(:), allocatable **parm::bmp_pn**
- real ∗8, dimension(:), allocatable **parm::bmp_sn**
- real ∗8, dimension(:), allocatable **parm::bmp_flag**
- real ∗8, dimension(:), allocatable **parm::bmp_flos**
- real ∗8, dimension(:), allocatable **parm::bmp_seds**
- real ∗8, dimension(:), allocatable **parm::bmp_bacs**
- real ∗8, dimension(:), allocatable **parm::bmp_pps**
- real ∗8, dimension(:), allocatable **parm::bmp_sps**
- real ∗8, dimension(:), allocatable **parm::bmp_pns**
- real ∗8, dimension(:), allocatable **parm::bmp_sns**
- real ∗8, dimension(:), allocatable **parm::bmp_flot**
- real ∗8, dimension(:), allocatable **parm::bmp_sedt**
- real ∗8, dimension(:), allocatable **parm::bmp_bact**
- real ∗8, dimension(:), allocatable **parm::bmp_ppt**
- real ∗8, dimension(:), allocatable **parm::bmp_spt**
- real ∗8, dimension(:), allocatable **parm::bmp_pnt**
- real ∗8, dimension(:), allocatable **parm::bmp_snt**
- real ∗8, dimension(:,:), allocatable **parm::dtp_wdratio**
- real ∗8, dimension(:,:), allocatable **parm::dtp_depweir**
- real ∗8, dimension(:,:), allocatable **parm::dtp_diaweir**
- real ∗8, dimension(:,:), allocatable **parm::dtp_retperd**
- real ∗8, dimension(:,:), allocatable **parm::dtp_pcpret**
- real ∗8, dimension(:,:), allocatable **parm::dtp_cdis**
- real ∗8, dimension(:,:), allocatable **parm::dtp_flowrate**
- real ∗8, dimension(:,:), allocatable **parm::dtp_wrwid**
- real ∗8, dimension(:,:), allocatable **parm::dtp_addon**
- real ∗8, dimension(:), allocatable **parm::ri_subkm**
- real ∗8, dimension(:), allocatable **parm::ri_totpvol**
- real ∗8, dimension(:), allocatable **parm::irmmdt**
- real ∗8, dimension(:,:), allocatable **parm::ri_sed**
- real ∗8, dimension(:,:), allocatable **parm::ri_fr**
- real ∗8, dimension(:,:), allocatable **parm::ri_dim**
- real ∗8, dimension(:,:), allocatable **parm::ri_im**
- real ∗8, dimension(:,:), allocatable **parm::ri_iy**
- real ∗8, dimension(:,:), allocatable **parm::ri_sa**
- real ∗8, dimension(:,:), allocatable **parm::ri_vol**
- real ∗8, dimension(:,:), allocatable **parm::ri_qi**

- real ∗8, dimension(:,:), allocatable **parm::ri_k**
- real ∗8, dimension(:,:), allocatable **parm::ri_dd**
- real ∗8, dimension(:,:), allocatable **parm::ri_evrsv**
- real ∗8, dimension(:,:), allocatable **parm::ri_dep**
- real ∗8, dimension(:,:), allocatable **parm::ri_ndt**
- real ∗8, dimension(:,:), allocatable **parm::ri_pmpvol**
- real ∗8, dimension(:,:), allocatable **parm::ri_sed_cumul**
- real ∗8, dimension(:,:), allocatable **parm::hrnopcp**
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time interval for subdaily routing

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- real ∗8 **parm::ff2**

7.9.1 Detailed Description

file containing the module parm

Author

modified by Javier Burguete Tolosa

7.10 readbsn.f90 File Reference

this subroutine reads data from the basin input file (.bsn). This file contains information related to processes modeled or defined at the watershed level

Functions/Subroutines

- subroutine **readbsn**

7.10.1 Detailed Description

this subroutine reads data from the basin input file (.bsn). This file contains information related to processes modeled or defined at the watershed level

Author

modified by Javier Burguete

7.11 readfcst.f90 File Reference

this subroutine reads the HRU forecast weather generator parameters from the .cst file

Functions/Subroutines

- subroutine **readfcst**

7.11.1 Detailed Description

this subroutine reads the HRU forecast weather generator parameters from the .cst file

Author

modified by Javier Burguete

7.12 readfert.f90 File Reference

Functions/Subroutines

- subroutine readfert

  this subroutine reads input parameters from the fertilizer/manure (i.e. nutrient) database (fert.dat)

7.12.1 Detailed Description

file containing the subroutine readfert

Author

modified by Javier Burguete

7.13 readfig.f90 File Reference

Functions/Subroutines

- subroutine readfig

  reads in the routing information from the watershed configuration input file (.fig) and calculates the number of subbasins, reaches, and reservoirs

7.13.1 Detailed Description

file containing the subroutine readfig

Author

modified by Javier Burguete

7.14 readfile.f90 File Reference

this subroutine opens the main input and output files and reads watershed information from the file.cio

Functions/Subroutines

- subroutine **readfile**

7.14.1 Detailed Description

this subroutine opens the main input and output files and reads watershed information from the file.cio

Author

modified by Javier Burguete

7.15 readlup.f90 File Reference

Functions/Subroutines

- subroutine readlup

  this subroutine reads data from the HRU/subbasin management input file (.mgt). This file contains data related to management practices used in the HRU/subbasin.

7.15.1 Detailed Description

file containing the subroutine readlup

Author

modified by Javier Burguete

7.16 readpest.f90 File Reference

Functions/Subroutines

- subroutine readpest

  this subroutine reads parameters from the toxin/pesticide database (pest.dat)

7.16.1 Detailed Description

file containing the subroutine readpest

Author

modified by Javier Burguete

7.17 readplant.f90 File Reference

Functions/Subroutines

- subroutine readplant

  this subroutine reads input parameters from the landuse/landcover database (plant.dat)

7.17.1 Detailed Description

file containing the subroutine readplant

Author

modified by Javier Burguete

7.18 readsepticbz.f90 File Reference

Functions/Subroutines

- subroutine readsepticbz

  this subroutine reads data from the septic input file (.sep). This file contains information related to septic tanks modeled or defined at the watershed level

7.18.1 Detailed Description

file containing the subroutine readsepticbz

Author

modified by Javier Burguete

7.19 readtill.f90 File Reference

Functions/Subroutines

- subroutine readtill

  this subroutine reads input data from tillage database (till.dat)

7.19.1 Detailed Description

file containing the subroutine readtill

Author

modified by Javier Burguete

7.20 readurban.f90 File Reference

Functions/Subroutines

- subroutine readurban

  this subroutine reads input parameters from the urban database (urban.dat). Information from this database is used only if the urban buildup/washoff routines are selected for the modeling of urban areas.

7.20.1 Detailed Description

file containing the subroutine readurban

Author

modified by Javier Burguete

7.21 readwwq.f90 File Reference

this subroutine reads the watershed stream water quality input data (.wwq file) and initializes the QUAL2E variables which apply to the entire watershed

Functions/Subroutines

- subroutine **readwwq**

7.21.1 Detailed Description

this subroutine reads the watershed stream water quality input data (.wwq file) and initializes the QUAL2E variables which apply to the entire watershed

Author

modified by Javier Burguete

7.22 simulate.f90 File Reference

this subroutine contains the loops governing the modeling of processes in the watershed

Functions/Subroutines

- subroutine **simulate**

7.22.1 Detailed Description

this subroutine contains the loops governing the modeling of processes in the watershed

Author

modified by Javier Burguete

Bibliography

[1] P Bratley, B L Fox, and L E Schrage. *A Guide to Simulation*. Springer-Verlag, New York, USA, 1983. 74

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