

REVISION 59.1 – May 7, 2019

- I. NEW_INPUT_FILES
Contains a list of new input files that are being tested.
- II. NEW_OUTPUT_FILES
Contains a list of new output files being review.
- III. Existing output files
List of changes in output files
- IV. Existing input files
List of changes in input files
- V. Other
Other files that were modified in this revision.

I. NEW INPUT FILES

II. NEW OUTPUT FILES

III. EXISTING OUTPUT FILES

IV. EXISTING INPUT FILES

V. OTHER

- Note on perennial plants: Don't plant/kill every year like it is an annual crop (example datasets edited to account for perennial plants)

- **`crop_yld_aa.out`** - file added headers

- **`cal_parms.cal`** - added **`dep_bot`**

<code>dep_bot</code>	<code>aqu</code>	0	10		m
edited: <code>flo_min</code> and <code>revap_min</code>					
<code>flo_min</code>	<code>aqu</code>	0	10		m
<code>revap_min</code>	<code>aqu</code>	0	10		m

(example dataset updated with new file)

- **`aquifer.aqu` file:** the values have changed in this file for the following (modular spreadsheet updated with new min/max and defaults and commit datasets updated)

<u>NEW</u>	<u>PREV</u>
<code>flo</code>	<code>flo</code>
	flow from aquifer (mm)
<code>dep_bot</code>	<code>stor</code>
	depth -mid-slope surface to bottom of aquifer (m)
<code>dep_wt</code>	<code>hgt</code>
	depth -mid-slope surface to water table (initial) (m)

...	
bf_max	bf_max
	delay max daily baseflow where all channels are contributing (only used for geomorphic baseflow) (mm)
flo_min	flo_min
	water table depth for return flow to occur (m)
revap_min	revap_min
	water table depth for revap to occur (m)

- mgt_harvgrainop.f90 renamed to mgt_harvgrain.f90
- addied mgt_harvtuber.f90
- added mgt_harvbiomass.f90
- hru_re_initialize.f90 is now called re_initialize.f90
- pl_nut_demand.f90 added
- cal_allo_init.f90 added
- removed mgt_harvestop.f90

REVISION 59 – April 16, 2019

- I. NEW_INPUT_FILES
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III. EXISTING OUTPUT FILES

- Added FLO_IN and AQU_IN to the aquifer SD output files;
- Units added back to all output files

IV. EXISTING INPUT FILES

- LUM.DTL – Deleted the crops that are cross walked with the plants.plt file that have been renamed in earlier revision (all datasets updated):

OLD	NEW
wwht1500	wwht
corn1500	corn
soyb1300	soyb

- IRR.OPS – This file updated (all datasets updated).

■ CAL_PARMS.CAL

- 1) added remaining tile calibration variables to this file;

tile_lag	hru	0	100	hrs
tile_rad	hru	3	40	mm
tile_dist	hru	7600	30000	mm
tile_drain	hru	10	51	mm/day
tile_pump	hru	0.00	10	mm/hr
tile_latk	hru	0.01	4	null

- 2) added pest calibration variables to this file;

pst_solub	pst	0	11000000	mg/L (ppm)
pst_aq_hlife	pst	0	10000	1/day
pst_aq_volat	pst	0	10	m/day
pst_aq_settle	pst	0	10	m/day
pst_aq_resus	pst	0	1	m/day
pst_ben_hlife	pst	0	10000	1/day
pst_ben_bury	pst	0	0.1	m/day
pst_ben_act_dep	pst	0	1	m

NOTE: cleaned up variables that were not being used in this file.

- FILE.CIO – Renaming of default calibration files; moved codes.sft for grouping all soft calibration files together

```
!! calibration change
type input_chg
character(len=25) :: cal_parms = "cal_parms.cal"
character(len=25) :: cal_upd = "calibration.cal"
character(len=25) :: codes_sft = "codes.sft"          !!old name codes.cal
character(len=25) :: wb_parms_sft = "wb_parms.sft"   !!old name ls_parms.cal
character(len=25) :: water_balance_sft = "water_balance.sft" !!old name ls_regions.cal
character(len=25) :: ch_sed_budget_sft = "ch_sed_budget.sft" !!old name ch_orders.cal
character(len=25) :: ch_sed_parms_sft = "ch_sed_parms.sft" !!old name ch_parms.cal
character(len=25) :: plant_parms_sft = "plant_parms.sft" !!old name pl_parms.cal
character(len=25) :: plant_gro_sft = "plant_gro.sft"   !!old name pl_regions.cal
end type input_chg
type (input_chg) :: in_chg
```

- PESTICIDE.PST - (headers only changed in this file – all datasets updated):
 - AQ_REAC → AQ_HLIFE
 - BEN_REAC → BEN_HLIFE
 -
- print.prt – HRU_CS removed from this file (if there);
- RES_REL.DTL – “below_prinipal” should be “below_principal” (commit data updated);
- RECCNST/ave annual option added in EXCO (CEAP_CONNECTIVITY_TEST dataset)
- Updated RECALL measured in commit data files to new format (deleted PSOL, PSOR, C, BACP, BACLP, MET1, MET2, MET3 columns)

3) OTHER

- An irrigation issue fixed in this revision; (unlim option added to decision tables);
- Added subroutine: define_unit_elements.f90
- CALHARD_CONTROL.F90 added;
- Renaming of default files for soft calibration:

OLD	NEW
codes.cal	codes.sft
ls_parms.cal	wb_parms.sft
ls_regions.cal	water_balance.sft
ch_orders.cal	ch_sed_budget.sft
ch_parms.cal	chsed_parms.sft
pl_parms.cal	plant_parms.sft
pl_regions.cal	plant_gro.sft

REVISION 58 – March 11, 2019

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I. NEW INPUT FILES

- INITIAL.AQU – New file

Location in FILE.CIO

```

! aquifer
type input_aqu
    character(len=25) :: init = "initial.aqu"
    character(len=25) :: aqu = "aquifer.aqu"
end type input_aqu
type (input_aqu) :: in_aqu

```

initial.aqu						
NAME	ORG-MIN	PESTICIDES	PATHOGENS	HEAVY_METALS	SALTS	
low_init	low_init	no_ini	no_ini	null	null	
high_init	high_init	low_ini	low_ini	null	null	

- These files are required for those input datasets that read a constituents.cs file (2-Stage/saturated buffer)

SALT_WATER.INI

salt_hru.ini:	SO4	Ca	Mg	Na	K	Cl	CO3	HCO3	CaCO3	MgCO3	CaSO4	MgSO4	NaCl
NAME													
no_salt													
soil	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2
plant	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2
low_hru													
soil	19	3.3	1.75	44	1	3.5	5	35	0.2	0.2	0.2	0.2	0.2
plant	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2
high_hru													
soil	1975	330	175	440	10	350	5	350	0.2	0.2	0.2	0.2	0.2
plant	19	3.3	1.75	44	1	3.5	5	35	0.2	0.2	0.2	0.2	0.2
low_aquifer													
soil	19	3.3	1.75	44	1	3.5	5	35	0.2	0.2	0.2	0.2	0.2
plant	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2
high_aquifer													
soil	19	3.3	1.75	44	1	3.5	5	35	0.2	0.2	0.2	0.2	0.2
plant	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2

SALT_HRU.INI

salt_hru.ini													
NAME	SO4	Ca	Mg	Na	K	Cl	CO3	HCO3	CaCO3	MgCO3	CaSO4	MgSO4	NaCl
no_salt													
soil	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2
plant	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2
low_hru													
soil	19	3.3	1.75	44	1	3.5	5	35	0.2	0.2	0.2	0.2	0.2
plant	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2
high_hru													
soil	1975	330	175	440	10	350	5	350	0.2	0.2	0.2	0.2	0.2
plant	19	3.3	1.75	44	1	3.5	5	35	0.2	0.2	0.2	0.2	0.2
low_aquifer													
soil	19	3.3	1.75	44	1	3.5	5	35	0.2	0.2	0.2	0.2	0.2
plant	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2
high_aquifer													
soil	19	3.3	1.75	44	1	3.5	5	35	0.2	0.2	0.2	0.2	0.2
plant	0	0	0	0	0	0	0	0	0.2	0.2	0.2	0.2	0.2

II. NEW OUTPUT FILES

III. EXISTING OUTPUT FILES

Removed the units line from all output files;

IV. EXISTING INPUT FILES

- **PESTICIDE.PST** – Database updated to combine land and aquatic parameters (all example datasets have this updated file as well as in the \database_files sub-directory).
- Remove **PESTICIDE.CHA** and **PESTICIDE.RES** files from **FILE.CIO** (no longer needed since they are now combined in **PESTICIDE.PST** file)
- Remove **PATHOGENS.CHA**, **METALS.CHA** and **SALT.CHA** files from **FILE.CIO** (in_cha)
- Remove **PATHOGENS.RES**, **METALS.RES** and **SALT.RES** from **FILE.CIO** (in_res)
- Changed the order of **SEDIMENT.RES** in **FILE.CIO** (in_res) (moved this after **HYDROLOGY.RES**)

- **CHANNEL.CHA** - DELETE THE FOLLOWING COLUMNS (last three columns):

CHA_PSTreservoir.res
CHA_LS_LNK
CHA_AQU_LNK

- **CHANNEL-LTE.CHA** – DELETE THE FOLLOWING COLUMNS:

CHA_PST
CHA_PATH
CHA_HMET
CHA_SALT
CHA_TEMP

Added **ID** to the front of this file;

- **RESERVOIR.RES** – DELETE THE LAST COLUMN:
RES_PST
- **SEDIMENT.RES** – Carbon and bulk density were added to this file
- **HYD-SED-LTE.CHA** –
 - 1) Carbon added to this file
 - 2) RTE_DB column taken out of this file
- **PLANTS.PLT** – updated files with DAY_MAT substituted for PLT_HU.
(Jeff incorporated the Potential Heat Unit Program with this revision)
- **AQUIFER.AQU** –
 - 1) added column AQU_INIT that is cross walked with INITIAL.AQU file;
 - 2) DELAY column replaced with BF_MAX(previous was named FLO_MAX).

BF_MAX is the baseflow rate

when entire area is contributing to baseflow.

- **SOILS_LTE.SOL** – Fixed a problem with the SILTY_CLAY entries that was duplicated.

- **PLANT.INI** – added initial rotation year to the input file (**ROT_YR_INI** in table below)

plant.ini:										
NAME	PLANTS_COM	ROT_YR_INI	CPNM	IGRO	LAI	BIOMS	PHUACC	POP	YRMAT	RSDIN
frst_mixed	1	1		frst	y	0	0	0	0	10000
pasture	1	1		past	n	0	0	0	0	3000
agriculture_land_gen	1	1		agr1	n	0	0	0	0	1000
urban_residential	1	1		berm	n	0	0	0	0	3000
corn_soybean	2	1			corn	n	0	0	0	2000
					soyb	n	0	0	0	2000
ryegrass	1	1			ryeg	y	1	500	0	0
canary_grass	1	1			cana	y	1	500	0	0
										2000

- **ROUT_UNIT.ELE** – HYP column deleted

rout_unit.ele					
NUMB	NAME	OBTYP	OBTYPNO	FRAC	DR
1	hru1	hru	1	0.5	0.00
2	hru2	hru	2	0.5	0.00

- **FILE.CIO** – ADDED SOILS_LTE.SOL to file.cio (partial file below):

SOILS	soils.sol	nutrients.sol	soils_lte.sol	
DECISION_TABLE	lum.dtl	res_rel.dtl	scen_lu.dtl	flo_con.dtl

- **CAL_PARMS.CAL** file – example input datasets updated with new file (LREW):

- 1) Removed PST and PLT variables in this database file;
- 2) The **GW** variables in OBJ_TYP changed to **AQU**
- 3) “delay” variable (in AQU OBJ_TYP column) renamed to “bf_max”

Range = 0-2

Units = mm

- **CAL_PARMS_CAL** file (continued) – added following calibration variables to database file.

NAME	OBJ_TYP	ABSMIN	ABSMAX	UNITS
snofall_tmp	hru	-20	20	degrees
snomelt_tmp	hru	-20	20	degrees
snomelt_max	hru	0	20	mm/deg/c/day
snomelt_min	hru	0	20	mm/deg/c/day
snomelt_lag	hru	0	1	none

tile_dep	hru	0	6000	mm
tile_dtime	hru	0	100	hrs
tile_lag	hru	0	100	hrs

V. OTHER

Removed the following subroutines in the source codes:

```

hmet_hru_init.f90
path_hru.init.f90
path_water_init.f90
pest_hru_init.f90
pest_water_init.f90
constit_hyd_frac.f90
constit_water_frac.f90
constit_water_add.f90
ch_read_pst.f90
constit_hyd_add.f90
res_read_pst.f90
readlup.f90

```

Added new subroutines:

```

PEST_HRU_AQU_READ.F90
HMET_HRU_AQU_READ.F90
PATH_CHA_RES_READ.F90
SALT_CHA_RES_READ.F90
SALT_HRU_AQU_READ.F90
OUTPUT_LS_SALT_MODULE.F90
CONSTIT_DB_READ.F90

```

Code edited for LINUX compile:

- Change all i_exist statements:

Old	New
i_exist /=0 .or.	i_exist .or.
if (i_exist == 0 .or.	if (.not. i_exist .or.

- Ambiguous functions: om_add and om_mult_const (in organic_minteral_mass_module.f90)
- Deleted RES_CONVERT_MASS.F90 (TWO ROUTINES INCLUDED)
- AQU_READ_ELEMENTS.F90 – initialize MREG = 0 at top of routine;

REVISION 57 – December 17, 2018

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I. NEW INPUT FILES

Added new decision table file: flo_con.dtl

II. NEW OUTPUT FILES

New pesticide output files added. If the time series (day/month/year/aa for PEST in the PRINT.PRT file are set to 'y' the following pesticide files will be printed.

NOTE: these files are currently active, but have not been tested properly in this revision.

HRU_PESTICIDE:

hru_pest_day.txt
hru_pest_mon.txt
hru_pest_yr.txt
hru_pest_aa.txt

CHANNEL_PESTICIDE:

channel_pest_day.txt
channel_pest_mon.txt
channel_pest_yr.txt
channel_pest_aa.txt

RESERVOIR_PESTICIDE:

reservoir_pest_day.txt
reservoir_pest_mon.txt
reservoir_pest_yr.txt
reservoir_pest_aa.txt

BASIN_CHANNEL_PESTICIDE:

basin_ch_pest_day.txt
basin_ch_pest_mon.txt
basin_ch_pest_yr.txt
basin_ch_pest_aa.txt

BASIN_RESERVOIR_PESTICIDE:

basin_res_pest_day.txt
basin_res_pest_mon.txt
basin_res_pest_yr.txt
basin_res_pest_aa.txt

BASIN_LS_PESTICIDE:
basin_ls_pest_day.txt
basin_ls_pest_mon.txt
basin_ls_pest_yr.txt
basin_ls_pest_aa.txt

III. EXISTING OUTPUT FILES

IV. EXISTING INPUT FILES

- 1) recall_day.rec/recall_mon.rec/recall_ann.rec updated (2_stage dataset) to remove inputs in from previous revision:

PSOL, PSOR, BACP, BACLP, MET1, MET2, MET3

- 2) FILE.CIO – added the new decision table name to COND section
COND lum.dtl res_rel.dtl scen_lu.dtl **flo_con.dtl**

- 3) PRINT.PRT – added CS_PEST to file for constituents print (last line of print.prt)

- 4) AQUIFER.AQU – STOR column changed to DEP_BOT (10.0)
HGT column changed to DEP_WT (5.0)

V. OTHER

- Added following subroutines:
RLS_ROUTETILE.F90
DTBL_FLOCON_READ.F90
HRU_DTBL_ACTIONS.F90
HRU_PESTICIDE_OUTPUT.F90
CH_PESTICIDE_MODULE.F90
CH_PESTICIDE_OUTPUT.F90
RES_PEST_MODULE.F90
RES_PEST_OUTPUT.F90
BASIN_CH_PEST_OUTPUT.F90
BASIN_RES_PEST_OUTPUT.F90
BASIN_LS_PEST_OUTPUT.F90

0.

- Added: saturated_buffer input data files to the commit datasets
- Added: 2_stage_constituents input data files to the commit datasets
- Removed: 2_stage commit dataset
- Renamed the following subroutines:

 pst_apply.f90 – pest_apply.f90
 pst_decay.f90 – pest_decay.f90
 pst_enrsb.f90 – pest_enrsb.f90
 pst_lch – pest.lch.f90
 pst_pesty.f90 – pest_pesty.f90
 pst_soil_tot.f90 – pest_soil_tot.f90
 pst_washp.f90 – pest_washp.f90
 pestparm_read.f90 – pest_parm_read.f90

plantparm_read.f90 – plant_parm_read.f90
tillparm_read.f90 – till_parm_read.f90
fertparm_read.f90 – fert_parm_read.f90
urbanparm_read.f90 – urban_parm_read.f90
pathparm_read.f90 – path_parm_read.f90
septicparm_read.f90 – septic_parm_read.f90

REVISION 56 – November 6, 2018

- I. NEW_INPUT_FILES
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Other files that were modified in this revision.

I. NEW INPUT FILES

2 new files added to FILE.CIO – CHANNEL Section

- hyd-sed-lte.cha (formerly channel_lte.cha)
- temperature.cha (NAME column in ‘temperature.cha’ cross walked with CH_TEMP in ‘channel-lte.cha’)

temperature.cha:					
NAME	SNO_MLT	GW	SUR_LAT	BULK_CO	AIR_LAG
CHA1	1.00	0.97	1.00	0.0025	6.00

FILE.CIO – “INIT” Section added following files:

soil_plant.ini
om_water.ini
pest_hru.ini
pest_water.ini
path_hru.ini (formerly path_soil.ini)
path_water.ini
hmet_hru.ini
hmet_water.ini
salt_hru.ini
salt_water.ini

- **soil_plant.ini** - name column crossed walked in HRU-DATA.HRU (soil_plant_init column):
SW_FRAC – taken from PARAMETERS.BSN file, FFCB column
NUTRIENT – name from NUTRIENTS.SOL file;
PESTICIDES – name from PEST_HRU.INI file
PATHOGENS – name from PATH_HRU.INI file
HEAVY METALS – name from HMET_HRU.INI
SALTS – name from SALT_HRU.INI

soil_plant.ini							
NAME	SW_FRAC	NUTRIENTS	PESTICIDES	PATHOGENS	HEAVY_METALS	SALTS	
no_init	0.2	in25	no_ini_pst	no_ini_path	null	null	
low_init	0.7	in25	low_ini_pst	low_ini_path	null	null	

■ **pest_hru.ini** – NAME cross walked from PESTICIDES column in SOIL_PLANT.INI file

pest_hru.ini:			
NAME		PLANT	SOIL
low_ini_pst			
	aatrex	0.1	0.6
	banvel	0.05	0.5
	prowl	0	0.4
	roundup	0.01	0.7
NAME		PLANT	SOIL
no_ini_pst			
	aatrex	0	0
	banvel	0	0
	prowl	0	0
	roundup	0	0

■ **path_hru.ini** – cross walked from PATHOGENS column in SOIL_PLANT.INI file;

path_hru.ini:			
NAME		PLANT	SOIL
low_ini_path			
	fecal_coliform	0.1	0.6
	e_coli	0.05	0.5
NAME		PLANT	SOIL
low_ini_path			
	fecal_coliform	0	0
	e_coli	0	0

■ **hmet_hru.ini** – cross walked from HEAVY_METALS column in SOIL_PLANT.INI file (not currently active)

■ **salt_hru.ini** – cross walked from SALTS column in SOIL_PLANT.INI file; (not currently active)

■ **om_water.ini** – name column – cross walked in initial.res/initial.cha ORG-MIN column;

om_water.ini	flo	sed	orgn	sedp	no3	solp	chia	nh3	no2	cbod	dox	san	sil	cla	sag	lag	grv	temp	C
om_low_init	0.8	1000	90	80	70	60	30	20	10	9	8	2	1	1000	90	80	70	60	50
om_high_init	0.9	1100	99	88	77	66	33	22	11	19	28	82	91	1900	98	87	76	65	54

- **pest_water.ini** - name column cross walked with initial.cha/initial.res, PESTICIDES column

pest_water.ini:						
NAME	Water	SOL	SOR	BENTHIC	SOL	SOR
low_ini_wat_pst						
	aatrex	0.1	0.6		0.001	0.8
	banvel	0.05	0.5		0.002	0.81
	prowl	0	0.4		0.003	0.82
	roundup	0.01	0.7		0.004	0.83
NAME	Water	SOL	SOR	BENTHIC	SOL	SOR
no_ini_wat_pst						
	aatrex	0	0		0	0
	banvel	0	0		0	0
	prowl	0	0		0	0
	roundup	0	0		0	0

- **path_water.ini** – name column cross walked with initial.cha/initial.res, PATHOGENS column

path_water.ini							
NAME		Water	SOL	SOR	Benthic	SOL	SOR
low_ini_wat_path							
	fecal_coliform		0.1	0.6		0.001	0.4
	e_coli		0.05	0.5		0.002	0.7
NAME		Water	SOL	SOR	Benthic	SOL	SOR
no_ini_wat_path							
	fecal_coliform		0	0		0	0
	e_coli		0	0		0	0

- **hmet_water.ini** (not currently active)
- **salt_water.ini** (not currently active)
- Split the decision table file into three new files (d_table.dtl no longer exists)
 - lum.dtl** (landuse management table)
 - res_rel.dtl** (reservoir/release table)
 - scen_lu.dtl** (scenario/landuse table)

II. NEW OUTPUT FILES

hru_pathogen_output – HRU_PATH_*.TXT
 hru_pesticide_output – HRU_PEST_*.TXT

III. EXISTING OUTPUT FILES

- All of the output files were renamed in this revision. The output filenames should match with the objects in the print.prt file. A list of the new names are listed in this document under RENAME OUTPUT.
- Removed bactp and bactlp from the following output files:
 - hru_ls_day.txt (formerly named 'losses_day_hru.txt')
 - hru_ls_mon.txt (formerly named 'losses_mon_hru.txt')
 - hru_ls_yr.txt (formerly named 'losses_yr_hru.txt')
 - hru_ls_aa.txt (formerly named 'losses_aa_hru.txt')
- Removed: PSOL, PSOR, BACP, BACLP, MET1, MET2, MET3 from the following output files:
 - basin_res_*.txt (formerly 'reservoir_*_bsn.txt')
 - removed: bres_d → added: bres_in_d, bres_out_d
 bres_m → added: bres_in_m, bres_out_m
 bres_y → added: bres_in_y, bres_out_y
 bres_a → added: bres_in_a, bres_out_a
 - reservoir_*.txt (name not changed)
 removed: res_d → added: res_in_d, res_out_d
 res_m → added: res_in_m, res_out_m
 res_y → added: res_in_y, res_out_y
 res_a → added: res_in_a, res_out_a
 - wetland_*.txt (name not changed)
 removed: wet_d → added: wet_in_d, wet_out_d
 wet_m → added: wet_in_m, wet_out_m
 wet_y → added: wet_in_y, wet_out_y
 wet_a → added: wet_in_a, wet_out_a
 - hydin_*.txt (name not changed)
 - hydout_*.txt (name not changed)
 - deposition_*.txt (name not changed)
 - basin_psc_*.txt (formerly 'pts_day_bsn.txt') (recall)

IV. EXISTING INPUT FILES

CAL_PARMS.UPD (database file updated – not user supplied)

- Replaced DEPIMP with PERCO
- Deleted CNCOEF and SMXCO

PLANTS.PLT

- added Juniper plant (updated all datasets)
- added variable curyr_gro to database

HYDROLOGY.HYD – MOVE PERCO column to REPLACE the DEP_IMP column

PARAMETERS.BSN – The following columns are no longer being used and are open for future development:

CN_COEF – in the type, called	openvar1
SMXCO - "	openvar2
R2ADJ - "	openvar3

■ **FERTILIZER.FRT** –

- Removed columns BACTPB, BACTLPDB and BACTKDDB; A added 'Pathogens' column (character, currently all set == 'null')
- Previous fertilizer files were off by a line; this file corrected and all values should be correct.
All committed datasets files were updated.
-

fertilizer.frt								
FERTNM	FMINN	FMINP	FORGN	FORGP	FNH3N	Pathogens	Description	
elem_n	1	0	0	0	0	null	ElementalNitrogen	
elem_p	0	1	0	0	0	null	ElementalPhosphorous	
anh_nh3	0.82	0	0	0	1	null	AnhydrousAmmonia	
urea	0.46	0	0	0	1	null	Urea	
46_00_00	0.46	0	0	0	0	null	46_00_00	

■ **AQUIFER.AQU** – Header 'REVAP' changed to 'REVAP_CO'

■ **LS_UNIT.DEF** – Check line #2 to ensure it includes total number

```
ls_unit.def
1 ←
SUB_NUMB      SUB_NAME      SUB_AREA      ELEM_TOT      ELEM1      ELEM2
1            lcu1        493.38       1           1          2
```

■ **FILE.CIO** – DECISION_TABLE section updated with three new files;
DECISION_TABLE lum.dtl res_rel.dtl scen_lu_dtl

■ **PESTICIDE.CHA**

SEDPST_CONC/SPST_CONC is now PST_SOLUB (pesticide solubility)

■ **CHANNEL-LTE.CHA FILE** – format change and cross walk files;

channel-lte.cha									
CHA_NAME	CHA_INI	CHA_HYD	CHA_SED	CHA_NUT	CHA_PST	CHA_PATH	CHA_HMET	CHA_SALT	CH_TEMP
cha1	high_init	First_Ord1	null	midwest_1stord	organochlorines	e_coli	null	null	null
cha2	low_init	Gully_hru2	null	midwest_1stord	epsp_inhibitors	fecal_coliform	null	null	null

Where: CHA_INI → initial.cha
 CHA_HYD → hyd-sed-lte.cha
 CHA_SED → sediment.cha (not currently used)
 CHA_NUT → nutrients.cha
 CHA_PST → pesticide.cha
 CHA_PATH → pathogens.cha
 CHA_HMET → metals.cha
 CHA_SALT → salt.cha

CHA_TEMP → temperature.cha

■ **INITIAL.CHA FILE** – format change and crosswalk files;

initial.cha	ORG-MIN	PESTICIDES	PATHOGENS	HEAVY_METALS	SALTS
low_init	low_init	no_ini	no_ini	null	null
high_init	high_init	low_ini	low_ini	null	null

Where: ORG-MIN → om_water.ini
PESTICIDES → pest_water.ini
PATHOGENS → path_water.ini
HEAVY_METALS → hmet_water.ini
SALTS → salt_water.ini

■ **INITIAL.RES FILE** – format of file changed and crosswalk files:

Note: Initial.res file must have ORG-MIN filename

initial.res	ORG-MIN	PESTICIDES	PATHOGENS	HEAVY_METALS	SALTS
low_init	low_init	no_ini	no_ini	null	null
high_init	high_init	low_ini	low_ini	null	null

Where: ORG-MIN → om_water.ini
PESTICIDES → pest_water.ini
PATHOGENS → path_water.ini
HEAVY_METALS → hmet_water.ini
SALTS → salt_water.ini

■ **HRU-DATA.HRU** – change header “soil_nutr_init” to “soil_plant_init”

■ **PST_CONC** and **SPST_CONC** have been removed from calibration parameters.

■ **EXCO_OM.EXC** – The following columns/inputs removed from this file:

PSOL, PSOR
BACP, BACLP, MET1, MET2, MET3

These inputs are now being read from: **EXCO_PEST.EXC** (see new input files section).

■ **DR_OM.DEL** – The following columns/inputs removed from this file:

PSOL, PSOR
BACP, BACLP, MET1, MET2, MET3

These inputs are now being read from: **DR_PEST.DEL** (see new input files section).

■ **RECALL_DAY.REC FILE** – The following columns/inputs removed from the **recall_day.rec**, **recall_ann.rec** and **recall_month.rec** files)

PSOL, PSOR

BACP, BACLP, MET1, MET2, MET3

V. OTHER

- Added new subroutines:

CH_PESTICIDE_OUTPUT.F90
CH_PESTICIDE_MODULE.F90
CH_PATHOGEN_OUTPUT.F90
CH_PATHOGEN_MODULE.F9
CHANNEL_OM_OUTPUT.F90
CH_READ_TEMP.F90
CH_RTPATH.F90
CH_WATQUAL4.F90
CONSTIT_WATER_FRAC.F90
CONSTIT_WATER_ADD.F90
DTBL_SCEN_READ.F90
DTBL_LUM_READ.F90
DTBL_RES_READ.F90
HEADER_PATH.F90
HEADER_PEST.F90
HRU_PESTICIDE_OUTPUT.F90
HRU_PATHOGEN_OUTPUT.F90
HYD_CONVERT_MASS_TO_CONC.f90 (included in hydrograph_module.f90)
HYD_CONVERT_CONC_TO_MASS.f90 (included in hydrograph_module.f90)
PATHOGEN_INIT.F90
OM_WATER_INIT.F90
PEST_WATER_INIT.F90
PATH_WATER_INIT.F90
OUTPUT_LS_PATHOGEN_MODULE.F90
OUTPUT_LS_PESTICIDE_MODULE.F90
SD_HYDSED_READ.F90
SD_HYDSED_INIT.F90
PATHPARM_READ.F90
PATH_LS_SWROUTING.F90
PATH_LS_PROCESS.F90
PATH_LS_RUNOFF.F90
PATHOGEN_DATA_MODULE.F90
PATH_APPLY.F90
SOIL_PLANT_INIT.F90
HMET_HRU_INIT.F90
PATH_HRU_INIT.F90
SALT_HRU_INIT.F90
PEST_HRU_INIT.F90
PST_APPLY.F90
RES_CONVERT_MASS.F90

- Deleted subroutines:

CH_RTBACT.F90
CH_RTHPEST.F90
BAC_READ_LSPARMS.F90

BACTERIA_INIT.F90
 HRU_SOIL_ASSIGN.F90
 MGT_TILLMIX.F90
 HMET_SOIL_INIT.F90
 PATH_SOIL_INIT.F90
 PEST_SOIL_INIT.F90
 SALT_SOIL_INIT.F90
 CH_RTHMUSK.F90

■ The following calibration subroutines were renamed:

Rev 56 - Calibration rename	
CALIBRATION ROUTINES	
OLD NAME	NEW NAME
cal_read_parms.f90	cal_parm_read.f90
chg_par.f90	cal_parm_chg.f90
current_par_val.f90	cal_parm_select.f90
update_init.f90	cal_conditions.f90
update_read_cond.f90	cal_cond_read.f90
update_read_parm.f90	cal_parmchg_read.f90
SOFT CALIBRATION ROUTINES	
OLD NAME	NEW NAME
cal_ave_output.f90	calsoft_ave_output.f90
cal_chsed.f90	calsoft_chsed.f90
cal_control.f90	calsoft_control.f90
cal_hyd.f90	calsoft_hyd.f90
cal_init.f90	calsoft_init.f90
cal_plant.f90	calsoft_plant.f90
cal_sed.f90	calsoft_sed.f90
cal_sum_output.f90	calsoft_sum_output.f90
calt_hyd.f90	caltsoft_hyd.f90
codes_read_cal.f90	calsoft_read_codes.f90

■ The following output files were renamed:

old output name	<u>NEW OUTPUT FILENAME</u>		old CSV filename	<u>NEW CVS FILE NAME</u>
waterbal_day_bsn.txt	basin_wb_day.txt		waterbal_day_bsn.csv	basin_wb_day.csv
waterbal_mon_bsn.txt	basin_wb_mon.txt		waterbal_mon_bsn.csv	basin_wb_mon.csv
waterbal_yr_bsn.txt	basin_wb_yr.txt		waterbal_yr_bsn.csv	basin_wb_yr.csv
waterbal_aa_bsn.txt	basin_wb_aa.txt		waterbal_aa_bsn.csv	basin_wb_aa.csv
nutbal_day_bsn.txt	basin_nb_day.txt		nutbal_day_bsn.csv	basin_nb_day.csv
nutbal_mon_bsn.txt	basin_nb_mon.txt		nutbal_mon_bsn.csv	basin_nb_mon.csv
nutbal_yr_bsn.txt	basin_nb_yr.txt		nutbal_yr_bsn.csv	basin_nb_yr.csv
nutbal_aa_bsn.txt	basin_nb_aa.txt		nutbal_aa_bsn.csv	basin_nb_aa.csv
losses_day_bsn.txt	basin_ls_day.txt		losses_day_bsn.csv	basin_ls_day.csv
losses_mon_bsn.txt	basin_ls_mon.txt		losses_mon_bsn.csv	basin_ls_mon.csv
losses_yr_bsn.txt	basin_ls_yr.txt		losses_yr_bsn.csv	basin_ls_yr.csv
losses_aa_bsn.txt	basin_ls_aa.txt		losses_aa_bsn.csv	basin_ls_aa.csv
plantwx_day_bsn.txt	basin_pw_day.txt		plantwx_day_bsn.csv	basin_pw_day.csv
plantwx_mon_bsn.txt	basin_pw_mon.txt		plantwx_mon_bsn.csv	basin_pw_mon.csv
plantwx_yr_bsn.txt	basin_pw_yr.txt		plantwx_yr_bsn.csv	basin_pw_yr.csv
plantwx_aa_bsn.txt	basin_pw_aa.txt		plantwx_aa_bsn.csv	basin_pw_aa.csv
aquifer_day_bsn.txt	basin_aqu_day.txt		aquifer_day_bsn.csv	basin_aqu_day.csv
aquifer_mon_bsn.txt	basin_aqu_mon.txt		aquifer_mon_bsn.csv	basin_aqu_mon.csv
aquifer_yr_bsn.txt	basin_aqu_yr.txt		aquifer_yr_bsn.csv	basin_aqu_yr.csv
aquifer_aa_bsn.txt	basin_aqu_aa.txt		aquifer_aa_bsn.csv	basin_aqu_aa.csv
reservoir_day_bsn.txt	basin_res_day.txt		reservoir_day_bsn.csv	basin_res_day.csv
reservoir_mon_bsn.txt	basin_res_mon.txt		reservoir_mon_bsn.csv	basin_res_mon.csv
reservoir_yr_bsn.txt	basin_res_yr.txt		reservoir_yr_bsn.csv	basin_res_yr.csv
reservoir_aa_bsn.txt	basin_res_aa.txt		reservoir_aa_bsn.csv	basin_res_aa.csv
channel_day_bsn.txt	basin_cha_day.txt		channel_day_bsn.csv	basin_cha_day.csv
channel_mon_bsn.txt	basin_cha_mon.txt		channel_mon_bsn.csv	basin_cha_mon.csv
channel_yr_bsn.txt	basin_cha_yr.txt		channel_yr_bsn.csv	basin_cha_yr.csv
channel_aa_bsn.txt	basin_cha_aa.txt		channel_aa_bsn.csv	basin_cha_aa.csv
channel_day_sd_bsn.txt	basin_sd_cha_day.txt		channel_day_sd_bsn.csv	basin_sd_cha_day.csv

channel_mon_sd_bsn.txt	basin_sd_cha_mon.txt		channel_mon_sd_bsn.csv	basin_sd_cha_mon.csv
channel_yr_sd_bsn.txt	basin_sd_cha_yr.txt		channel_yr_sd_bsn.csv	basin_sd_cha_yr.csv
channel_aa_sd_bsn.txt	basin_sd_cha_aa.txt		channel_aa_sd_bsn.csv	basin_sd_cha_aa.csv
pts_day_bsn.txt	basin_psc_day.txt		pts_day_bsn.csv	basin_psc_day.csv
pts_mon_bsn.txt	basin_psc_mon.txt		pts_mon_bsn.csv	basin_psc_mon.csv
pts_yr_bsn.txt	basin_psc_yr.txt		pts_yr_bsn.csv	basin_psc_yr.csv
pts_aa_bsn.txt	basin_psc_aa.txt		pts_aa_bsn.csv	basin_psc_aa.csv
waterbal_day_lsu.txt	lsunit_wb_day.txt		waterbal_day_lsu.csv	lsunit_wb_day.csv
waterbal_mon_lsu.txt	lsunit_wb_mon.txt		waterbal_mon_lsu.csv	lsunit_wb_mon.csv
waterbal_yr_lsu.txt	lsunit_wb_yr.txt		waterbal_yr_lsu.csv	lsunit_wb_yr.csv
waterbal_aa_lsu.txt	lsunit_wb_aa.txt		waterbal_aa_lsu.csv	lsunit_wb_aa.csv
nutbal_day_lsu.txt	lsunit_nb_day.txt		nutbal_day_lsu.csv	lsunit_nb_day.csv
nutbal_mon_lsu.txt	lsunit_nb_mon.txt		nutbal_mon_lsu.csv	lsunit_nb_mon.csv
nutbal_yr_lsu.txt	lsunit_nb_yr.txt		nutbal_yr_lsu.csv	lsunit_nb_yr.csv
nutbal_aa_lsu.txt	lsunit_nb_aa.txt		nutbal_aa_lsu.csv	lsunit_nb_aa.csv
losses_day_lsu.txt	lsunit_ls_day.txt		losses_day_lsu.csv	lsunit_ls_day.csv
losses_mon_lsu.txt	lsunit_ls_mon.txt		losses_mon_lsu.csv	lsunit_ls_mon.csv
losses_yr_lsu.txt	lsunit_ls_yr.txt		losses_yr_lsu.csv	lsunit_ls_yr.csv
losses_aa_lsu.txt	lsunit_ls_aa.txt		losses_aa_lsu.csv	lsunit_ls_aa.csv
plantwx_day_lsu.txt	lsunit_pw_day.txt		plantwx_day_lsu.csv	lsunit_pw_day.csv
plantwx_mon_lsu.txt	lsunit_pw_mon.txt		plantwx_mon_lsu.csv	lsunit_pw_mon.csv
plantwx_yr_lsu.txt	lsunit_pw_yr.txt		plantwx_yr_lsu.csv	lsunit_pw_yr.csv
plantwx_aa_lsu.txt	lsunit_pw_aa.txt		plantwx_aa_lsu.csv	lsunit_pw_aa.csv
waterbal_day_sd.txt	hru-lte_wb_day.txt		waterbal_day_sd.csv	hru-lte_wb_day.csv
waterbal_mon_sd.txt	hru-lte_wb_mon.txt		waterbal_mon_sd.csv	hru-lte_wb_mon.csv
waterbal_yr_sd.txt	hru-lte_wb_yr.txt		waterbal_yr_sd.csv	hru-lte_wb_yr.csv
waterbal_aa_sd.txt	hru-lte_wb_aa.txt		waterbal_aa_sd.csv	hru-lte_wb_aa.csv
nutbal_day_sd.txt	no nutrients hru-lte		nutbal_day_sd.csv	no nutrients hru-lte
nutbal_mon_sd.txt	no nutrients hru-lte		nutbal_mon_sd.csv	no nutrients hru-lte
nutbal_yr_sd.txt	no nutrients hru-lte		nutbal_yr_sd.csv	no nutrients hru-lte
nutbal_aa_sd.txt	no nutrients hru-lte		nutbal_aa_sd.csv	no nutrients hru-lte
losses_day_sd.txt	hru-lte_ls_day.txt		losses_day_sd.csv	hru-lte_ls_day.csv
losses_mon_sd.txt	hru-lte_ls_mon.txt		losses_mon_sd.csv	hru-lte_ls_mon.csv
losses_yr_sd.txt	hru-lte_ls_yr.txt		losses_yr_sd.csv	hru-lte_ls_yr.csv

losses_aa_sd.txt	hru-lte_ls_aa.txt		losses_aa_sd.csv	hru-lte_ls_aa.csv
plantwx_day_sd.txt	hru-lte_pw_day.txt		plantwx_day_sd.csv	hru-lte_pw_day.csv
plantwx_mon_sd.txt	hru-lte_pw_mon.txt		plantwx_mon_sd.csv	hru-lte_pw_mon.csv
plantwx_yr_sd.txt	hru-lte_pw_yr.txt		plantwx_yr_sd.csv	hru-lte_pw_yr.csv
plantwx_aa_sd.txt	hru-lte_pw_aa.txt		plantwx_aa_sd.csv	hru-lte_pw_aa.csv
channel_day.txt	channel_day.txt		channel_day.csv	channel_day.csv
channel_mon.txt	channel_mon.txt		channel_mon.csv	channel_mon.csv
channel_yr.txt	channel_yr.txt		channel_yr.csv	channel_yr.csv
channel_aa.txt	channel_aa.txt		channel_aa.csv	channel_aa.csv
channel_day_sd.txt	channel_sd_day.txt		channel_day_sd.csv	channel_sd_day.csv
channel_mon_sd.txt	channel_sd_mon.txt		channel_mon_sd.csv	channel_sd_mon.csv
channel_yr_sd.txt	channel_sd_yr.txt		channel_yr_sd.csv	channel_sd_yr.csv
channel_aa_sd.txt	channel_sd_aa.txt		channel_aa_sd.csv	channel_sd_aa.csv
output filename	same name		CSV filename	same name
aquifer_day.txt	aquifer_day.txt		aquifer_day.csv	aquifer_day.csv
aquifer_mon.txt	aquifer_mon.txt		aquifer_mon.csv	aquifer_mon.csv
aquifer_yr.txt	aquifer_yr.txt		aquifer_yr.csv	aquifer_yr.csv
aquifer_aa.txt	aquifer_aa.txt		aquifer_aa.csv	aquifer_aa.csv
output filename	same name		CSV filename	same name
reservoir_day.txt	reservoir_day.txt		reservoir_day.csv	reservoir_day.csv
reservoir_mon.txt	reservoir_mon.txt		reservoir_mon.csv	reservoir_mon.csv
reservoir_yr.txt	reservoir_yr.txt		reservoir_yr.csv	reservoir_yr.csv
reservoir_aa.txt	reservoir_aa.txt		reservoir_aa.csv	reservoir_aa.csv
output filename	same name		CSV filename	same name
wetland_day.txt	wetland_day.txt		wetland_day.csv	wetland_day.csv
wetland_mon.txt	wetland_mon.txt		wetland_mon.csv	wetland_mon.csv
wetland_yr.txt	wetland_yr.txt		wetland_yr.csv	wetland_yr.csv
wetland_aa.txt	wetland_aa.txt		wetland_aa.csv	wetland_aa.csv
output filename	same name		CSV filename	same name
hydin_day.txt	hydin_day.txt		hydin_day.csv	hydin_day.csv
hydin_mon.txt	hydin_mon.txt		hydin_mon.csv	hydin_mon.csv
hydin_yr.txt	hydin_yr.txt		hydin_yr.csv	hydin_yr.csv
hydin_aa.txt	hydin_aa.txt		hydin_aa.csv	hydin_aa.csv
output filename	same name		CSV filename	same name
hydout_day.txt	hydout_day.txt		hydout_day.csv	hydout_day.csv

hydout_mon.txt	hydout_mon.txt		hydout_mon.csv	hydout_mon.csv
hydout_yr.txt	hydout_yr.txt		hyd_yr_hyd.csv	hyd_yr_hyd.csv
hydout_aa.txt	hydout_aa.txt		hydout_aa.csv	hydout_aa.csv
output filename			CSV filename	
routing_units_day.txt	ru_day.txt		routing_units_day.csv	ru_day.csv
routing_units_mon.txt	ru_mon.txt		routing_units_mon.csv	ru_mon.csv
routing_units_yr.txt	ru_yr.txt		routing_units_yr.csv	ru_yr.csv
routing_units_aa.txt	ru_aa.txt		routing_units_aa.csv	ru_aa.csv
output filename	same name		CSV filename	
soil_nutcarb_out.txt	soil_nutcarb_out.txt		NO CSV FILE	
output filename	same name		CSV filename	
mgt_out.txt	mgt_out.txt		NO CSV FILE	
output filename	same name			
flow_duration_curve.out	flow_duration_curve.out			
pco%hyd== y	same name		CSV filename	same name
deposition_day.txt	deposition_day.txt		deposition_day.csv	deposition_day.csv
deposition_mon.txt	deposition_mon.txt		deposition_mon.csv	deposition_mon.csv
deposition_yr.txt	deposition_yr.txt		deposition_yr.csv	deposition_yr.csv
deposition_aa.txt	deposition_aa.txt		deposition_aa.csv	deposition_aa.csv
	same name		CSV filename	same name
channel.om_day.txt	channel.om_day.txt		channel.om_day.csv	channel.om_day.csv
channel.om_mon.txt	channel.om_mon.txt		channel.om_mon.csv	channel.om_mon.csv
channel.om_yr.txt	channel.om_yr.txt		channel.om_yr.csv	channel.om_yr.csv
channel.om_aa.txt	channel.om_aa.txt		channel.om_aa.csv	channel.om_aa.csv
	same name		CSV filename	same name
channel.path_day.txt	channel.path_day.txt		channel.path_day.csv	channel.path_day.csv
channel.path_mon.txt	channel.path_mon.txt		channel.path_mon.csv	channel.path_mon.csv
channel.path_yr.txt	channel.path_yr.txt		channel.path_yr.csv	channel.path_yr.csv
channel.path_aa.txt	channel.path_aa.txt		channel.path_aa.csv	channel.path_aa.csv
	same name		CSV filename	same name
hru_path_day.txt	hru_path_day.txt		hru_path_day.csv	hru_path_day.csv
hru_path_mon.txt	hru_path_mon.txt		hru_path_mon.csv	hru_path_mon.csv
hru_path_yr.txt	hru_path_yr.txt		hru_path_yr.csv	hru_path_yr.csv

hru_path_aa.txt	hru_path_aa.txt		hru_path_aa.csv	hru_path_aa.csv
	same name		CSV filename	same name
hru_pest_day.txt	hru_pest_day.txt		hru_pest_day.csv	hru_pest_day.csv
hru_pest_mon.txt	hru_pest_mon.txt		hru_pest_mon.csv	hru_pest_mon.csv
hru_pest_yr.txt	hru_pest_yr.txt		hru_pest_yr.csv	hru_pest_yr.csv
hru_pest_aa.txt	hru_pest_aa.txt		hru_pest_aa.csv	hru_pest_aa.csv

REVISION 55.2 – November 27, 2018

- I. NEW_INPUT_FILES
Contains a list of new input files that are being tested.
- II. NEW_OUTPUT_FILES
Contains a list of new output files being review.
- III. Existing output files
List of changes in output files
- IV. Existing input files
List of changes in input files
- V. Other
Other files that were modified in this revision.

I. NEW INPUT FILES

II. NEW OUTPUT FILES

III. EXISTING OUTPUT FILES

IV. EXISTING INPUT FILES

V. OTHER

- Renamed pl_leaf_mortality routine to pl_mortality
- Computational changes in pl_leaf_drop and pl_grow subroutines
- Fixed issue with harvest for clover crop in mgt_harvestop subroutine
- Added 2_stage_constituents to the commit datasets;

d:\modular_datasets_rev55_1\revision_notes\Rev55_1_docs

REVISION 55.1 – October 15, 2018

Note: This revision had some computational changes made.

- Rounding problem (Chris George)
- Backspace statement in daily weather routines

There were no input or output edits in this Revision 55.1.

- I. NEW_INPUT_FILES
Contains a list of new input files that are being tested.
 - II. NEW_OUTPUT_FILES
Contains a list of new output files being review.
 - III. Existing output files
List of changes in output files
 - IV. Existing input files
List of changes in input files
 - V. Other
Other files that were modified in this revision.
-
- I. **NEW INPUT FILES**
 - II. **NEW OUTPUT FILES**
 - III. **EXISTING OUTPUT FILES**
 - IV. **EXISTING INPUT FILES**
 - V. **OTHER**