

Appendix A: List of all general parameter changes during calibration process.

Manchester drainage (subs 2,4,5,6)

Parameter	Param code	Units	Original	Change	Notes
Threshold depth of water in shallow aquifer for "revap" to occur	REVAPMN	mm	1	0	Decreased to lowest suggested value by calibration tips in order to reduce baseflow
Groundwater "revap" coefficient	GW_REVAP		0.02	0.2	Increased to highest suggested according to calibration tips in order to reduce baseflow
Baseflow alpha factor	ALPHA_BF	days	0.048	0.0068	Value suggested by Baseflow Filter program for Manchester USGS station
Threshold depth of water in shallow aquifer for return flow to occur	GWQ_MN	mm	0	50	Increased according to calibration tips in order to reduce baseflow
Groundwater delay	GW_DELAY	days	31	5	Study area has shallow water table and high soil permeabilities

Adrian drainage (subs 1-12,28-31)

Note: though drainage area includes Manchester drainage area, parameters were not changed from values listed above

Parameter	Param code	Units	Original	Change	Notes
Baseflow alpha factor	ALPHA_BF	days	0.048	0.015	Adjusted value based on Baseflow Filter program for Adrian
Groundwater "revap" coefficient	GW_REVAP		0.02	0.2	Increased to highest suggested according to calibration tips in order to reduce baseflow
Groundwater delay	GW_DELAY	days	31	5	Study area has shallow water table and high soil permeabilities

Monroe drainage (subs 1-34)

Note: though drainage area includes Manchester and Adrian drainage area, parameters were not changed from values listed above

Parameter	Param code	Units	Original	Change	Notes
Baseflow alpha factor	ALPHA_BF	days	0.048	0.0118	Value suggested by Baseflow Filter program for Manchester USGS station (applied to sub 35 too)
Threshold depth of water in shallow aquifer for return flow to occur	GWQ_MN	mm	0	0.82	Increased according to calibration tips in order to reduce baseflow
Groundwater "revap" coefficient	GW_REVAP		0.02	0.2	Increased to highest suggested according to calibration tips in order to reduce baseflow
Groundwater delay	GW_DELAY	days	31	5	Study area has shallow water table and high soil permeabilities

Whole watershed (subs 1-35)

Parameter	Param code	Units	Original	Change	Notes
Minimum snow melt rate	SMFMN	mm/degC-day	4.5	1	More appropriate for study area
Maximum snow melt rate	SMFMX	mm/degC-day	4.5	1	More appropriate for study area
Initial soil water	FFCP		0	0.75	Allows SWAT to rapidly forget initial conditions
Nitrogen in rainfall	RCN	mg N/L	1	0.72	From analysis of local N dep data from 1994 to 1999
Soil evaporation compensation factor	ESCO		0.95	1.05	Increased to increase total flow
Initial SCS curve number for moisture condition II	CN2			-15%	Decreased in order to reduce surface flow for all subbasins, landuses and soil types
Available water capacity of the soil layer	SOL_AWC	mm/mm		+40%	Increased in order to reduce surface flow for all subbasins, landuses, soil types, and soil layers
Coefficient for calculating max sediment retrained	SPCON		0.0001	0.0003	Increased to increase sediment transport out of watershed
Exponent for calculating max sediment retrained	SPEXP		1	0.72	Decreased to decrease sediment transport out of watershed
Average slope length	SLSUBBSN		91.463	81.46	Decreased to decrease sediment loading from land
Average slope steepness	HRU_SLP		0.029	0.023	Decreased 20% to decrease sediment loading from land
Nitrogen percolation coefficient	NPERCO		0.2	0.01	Decreased to decrease mineral nitrogen loading from land
Phosphorus percolation coefficient	PPERCO		10	0.30	Decreased to decrease mineral phosphorus loading from land

Initial labile (soluble) P concentration in soil layer	SOL_ORGP	mg/kg	5	0.01	Decreased to decrease mineral phosphorus loading from land
Initial organic P concentration in soil layer	SOL_LABP	mg/kg	5	0.01	Decreased to decrease mineral phosphorus loading from land
Initial labile (soluble) N concentration in soil layer	SOL_ORGN	mg/kg	5	4.00	Decreased in forested areas only to decrease mineral phosphorus loading from land
Initial organic N concentration in soil layer	SOL_LABN	mg/kg	5	4.00	Decreased in forested areas only to decrease mineral phosphorus loading from land

Appendix B: List of HRU-specific changes to CN2 (Initial SCS curve number for moisture condition II) parameter.

Whole watershed (subs 1-35)

Parameter	Param code	Original	Change	Notes
Initial SCS curve number for moisture condition II	CN2	69	59	For all range land in all subbasins
Initial SCS curve number for moisture condition II	CN2	45	38	For all forested wetland land in all subbasins
Initial SCS curve number for moisture condition II	CN2	49	42	For all mixed wetland land in all subbasins
Initial SCS curve number for moisture condition II	CN2	66	56	For all deciduous forest land in all subbasins
Initial SCS curve number for moisture condition II	CN2	92	78	For all water land in all subbasins
Initial SCS curve number for moisture condition II	CN3	66	56	For all high density residential in all subbasins
Initial SCS curve number for moisture condition II	CN4	83	71	For all low density residential in all subbasins
				Subbasin HRU
Initial SCS curve number for moisture condition II	CN2	67	57	2 18
Initial SCS curve number for moisture condition II	CN2	78	66	2 19
Initial SCS curve number for moisture condition II	CN2	67	57	4 35
Initial SCS curve number for moisture condition II	CN2	78	66	4 36
Initial SCS curve number for moisture condition II	CN2	67	57	5 50
Initial SCS curve number for moisture condition II	CN2	78	66	5 51
Initial SCS curve number for moisture condition II	CN2	78	66	5 52
Initial SCS curve number for moisture condition II	CN2	67	57	6 58
Initial SCS curve number for moisture condition II	CN2	78	66	1 7
Initial SCS curve number for moisture condition II	CN2	79	67	1 8
Initial SCS curve number for moisture condition II	CN2	79	67	1 9
Initial SCS curve number for moisture condition II	CN2	78	66	3 27
Initial SCS curve number for moisture condition II	CN2	78	66	3 28
Initial SCS curve number for moisture condition II	CN2	79	67	3 29
Initial SCS curve number for moisture condition II	CN2	67	57	7 70
Initial SCS curve number for moisture condition II	CN2	78	66	7 71
Initial SCS curve number for moisture condition II	CN2	79	67	7 72
Initial SCS curve number for moisture condition II	CN2	78	66	8 79
Initial SCS curve number for moisture condition II	CN2	79	67	8 80
Initial SCS curve number for moisture condition II	CN2	78	66	9 90
Initial SCS curve number for moisture condition II	CN2	79	67	9 91
Initial SCS curve number for moisture condition II	CN2	79	67	9 92
Initial SCS curve number for moisture condition II	CN2	78	66	10 101
Initial SCS curve number for moisture condition II	CN2	79	67	10 102
Initial SCS curve number for moisture condition II	CN2	79	67	10 103
Initial SCS curve number for moisture condition II	CN2	79	67	11 107

Initial SCS curve number for moisture condition II	CN2	78	66	29	213
Initial SCS curve number for moisture condition II	CN2	67	57	30	220
Initial SCS curve number for moisture condition II	CN2	79	67	30	221
Initial SCS curve number for moisture condition II	CN2	79	67	30	222
Initial SCS curve number for moisture condition II	CN2	79	67	31	227
Initial SCS curve number for moisture condition II	CN2	79	67	31	228
Initial SCS curve number for moisture condition II	CN2	79	67	32	232
Initial SCS curve number for moisture condition II	CN2	79	67	32	233
Initial SCS curve number for moisture condition II	CN2	79	67	32	234
Initial SCS curve number for moisture condition II	CN2	79	67	33	238
Initial SCS curve number for moisture condition II	CN2	78	66	33	239
Initial SCS curve number for moisture condition II	CN2	79	67	34	240
Initial SCS curve number for moisture condition II	CN2	79	67	34	241
Initial SCS curve number for moisture condition II	CN2	79	67	35	249

Appendix C: List of soil layer-specific changes to SOL_AWC (Available water capacity of the soil layer) parameter.

Whole watershed (subs 1-35)

Parameter	Param code	Units	Original	Change	Notes	Soil	Layer
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.12	0.17	MI018		1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.08	0.11	MI018		2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.12	0.17	MI018		3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.03	0.04	MI018		4
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.16	0.22	MI006		1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.19	0.27	MI006		2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.16	0.22	MI006		3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.16	0.22	MI006		4
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.19	0.27	MI055		1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.16	0.22	MI055		2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.14	0.20	MI055		3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.35	0.49	MI014		1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.35	0.49	MI014		2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.12	0.17	MI041		1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.14	0.20	MI041		2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.09	0.13	MI041		3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.15	0.21	MI021		1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.12	0.17	MI021		2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.16	0.22	MI021		3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.18	0.25	MI031		1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.19	0.27	MI031		2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.15	0.21	MI031		3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.19	0.27	MI002		1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.16	0.22	MI002		2

Available water capacity of the soil layer	SOL_AWC	mm/mm	0.18	0.25	MI002	3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.17	0.24	MI004	1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.19	0.27	MI004	2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.15	0.21	MI004	3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.07	0.10	MI054	1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.05	0.07	MI054	2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.04	0.06	MI054	3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.13	0.18	MI052	1
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.09	0.13	MI052	2
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.09	0.13	MI052	3
Available water capacity of the soil layer	SOL_AWC	mm/mm	0.03	0.04	MI052	4