

Table A-1 – Model Components Applied for the BCB Model

Model Component	Simulates	Fully Dynamic Coupling with:	Dimension	Governing Equation
MIKE SHE OC	Overland sheet flow and water depth, depression storage	MIKE SHE SZ, UZ and MIKE 11	2-D	Saint-Venants equation (kinematic wave approximation)
MIKE 11	Fully dynamic river and canal hydraulics (flow and water level)	MIKE SHE SZ, OL	1-D	Saint-Venants equation (dynamic wave approximation)
MIKE SHE UZ	Flow and water content of the unsaturated zone, infiltration and groundwater recharge	MIKE SHE SZ, OL	1-D	Richard's equation / gravitational flow (no effects of capillary potential)
MIKE SHE ET	Soil and free water surface evaporation, plant transpiration	MIKE SHE UZ, OL	-	Kristensen & Jensen / Penman-Monteith
MIKE SHE SZ	Saturated zone (groundwater) flows and water levels	MIKE SHE UZ, OL, and MIKE 11	3-D	Boussinesqs' equation
MIKE SHE IR	Irrigation demands (soil water deficit) and allocation (surface water/ groundwater)	MIKE SHE SZ, MIKE 11	-	-
MIKE SHE PP	Pre- and post-processing	-	-	-

Table A-2. Vegetation Parameters.

Model Land Use Type	Growth Period	Leaf Area Index (-)	Root Depth (mm)	Crop Coef. Kc (-)	AROOT
Citrus	All year	4.5	1250	0.77-0.9047	0.25
Pasture	All year	3-4	750	0.7	0.5
Sugar Cane	All year	1-6	500-1500	0.665-1	0.25
Urban Low Density	All year	1-2	200	0.552-0.777	0.5
Urban Medium Density	All year	0.5-1	200	0.552-0.777	0.5
Urban High Density	All year	0.1-0.2	200	0.552-0.777	0.5
Truck Crops	All year	3-4.5	152-750	0.561-1	0.5
Golf Course	All year	2-3	750	0.552-0.777	0.75
Bare Ground	NA	0	0	1	0.25
Mesic Flatwood	All year	1.5-3	1219	0.246-0.82	1
Mesic Hammock	All year	2.5-4	610	0.246-0.82	1
Xeric Flatwood	All year	1-2	1219	0.221-0.738	0.5
Xeric Hammock	All year	2-3	610	0.221-0.738	0.5
Hydric Flatwood	All year	1.5-3	1219	0.237-0.79	1.5
Hydric Hammock	All year	2.5-4	610	0.237-0.711	1.5
Wet Prairie	All year	1.5-3	152	0.225-0.75	2
Dwarf Cypress	All year	1-2	152	0.22-0.734	1
Marsh	All year	2-4	152	0.254-0.845	2
Cypress	All year	2-4	1524	0.237-0.79	1
Swamp Forest	All year	3-5	1524	0.237-0.79	1
Mangrove	All year	3-4	1524	0.271-0.904	1
Water	NA	0	0	1	0.25

Table A-3 Annual time series and summary statistics of wet marsh potential evapotranspiration in inches estimated at 5 NOAA stations.

Year	La Belle	Ft Myers	Naples	Everglades City	Tamiami Trail
1965	56.57	57.96	59.53	62.05	60.80
1966	54.92	56.94	57.94	60.51	56.16
1967	58.40	56.46	59.36	60.73	63.63
1968	57.37	57.70	58.36	60.22	59.78
1969	56.72	53.86	58.11	60.46	56.65
1970	58.85	55.86	60.22	58.52	53.54
1971	61.77	57.34	61.43	60.25	61.22
1972	59.76	59.32	60.88	58.41	58.83
1973	57.06	59.23	61.91	60.27	59.57
1974	58.07	59.90	62.95	60.58	60.10
1975	58.97	59.61	62.70	58.42	59.04
1976	57.73	59.14	62.31	60.21	56.12
1977	58.69	57.89	61.44	59.61	57.40
1978	58.38	57.57	59.82	59.58	55.98
1979	56.35	57.93	60.48	57.97	58.29
1980	57.67	58.56	60.36	58.80	59.75
1981	59.41	60.05	63.16	60.43	62.67
1982	55.33	56.76	60.70	57.69	60.47
1983	54.48	54.26	59.79	57.51	57.95
1984	55.53	56.73	58.12	60.35	56.93
1985	56.87	58.30	57.75	60.30	61.93
1986	56.85	59.85	58.34	61.27	57.20
1987	55.08	58.74	56.96	60.21	56.57
1988	56.33	60.61	58.36	63.59	57.99
1989	57.56	61.41	58.70	56.99	64.46
1990	56.37	60.83	58.71	56.90	63.73
1991	55.61	58.12	56.90	59.62	59.45
1992	54.66	58.23	57.35	57.69	59.79
1993	54.35	57.82	57.95	60.45	54.22
1994	56.24	57.11	55.85	59.39	56.36
1995	54.83	55.46	55.62	58.75	54.22
1996	54.60	57.27	58.11	62.45	58.31
1997	55.18	59.45	56.89	59.47	57.63
1998	53.60	56.51	56.33	56.20	56.44
1999	56.08	57.63	56.67	57.31	56.16
2000	55.22	58.85	57.49	58.12	56.67
Ann Ave	56.71	58.04	59.10	59.48	58.50
Stdev	1.81	1.71	2.07	1.63	2.70
Max	61.77	61.41	63.16	63.59	64.46
Min	53.60	53.86	55.62	56.20	53.54
Kr	0.158	0.179	0.176	0.190	0.179

Table A-4. Land Use Types in the Model and Corresponding FLUCCS Codes.

Model Land Use Type	MIKE SHE Code	FLUCCS Code (Level)
Citrus	1	220
Pasture	2	210 (3), 242
Sugar Cane	3	2156
Urban Low Density	41	110 (2), 180 (2), 192, 193, 240 (3), 241, 243, 245, 246, 250 (2)
Urban Medium Density	42	1009, 120 (2), 144, 833, 834
Urban High Density	43	130 (2), 140 (2), 150 (3), 151, 155, 170 (2), 810 (2), 820 (2), 830 (2), 152, 153, 154, 159
Truck Crops	5	214, 215
Golf Course	6	182
Bare Ground	7	160 (3), 161, 162, 163, 182, 230 (2), 261, 740 (3), 742, 744, 835
Mesic Flatwood	8	190 (3), 191, 194, 260 (3), 310 (2), 321, 330 (2), 410 (3), 411, 414, 429, 435, 440 (3), 441, 443, 710 (2), 720 (2), 741
Mesic Hammock	9	420 (3), 422, 423, 426, 427, 434, 437, 438, 439
Xeric Flatwood	10	412, 413
Xeric Hammock	11	322, 421, 432
Hydric Flatwood	12	4119, 419, 624
Hydric Hammock	13	329, 424, 425, 428, 433, 610 (3), 611, 743
Wet Prairie	14	643, 6439
Dwarf Cypress	15	6219
Marsh	16	6171, 6172, 640 (3), 641, 6411, 6412, 644
Cypress	17	620 (3), 621, 6218, 745
Swamp Forest	18	613, 614, 615, 616, 617, 630 (2)
Mangrove	19	612, 642
Water	20	166, 500 (1)

Table A-5 Basic Operating Schedule - Big Cypress Basin Water Control Structures

Serial #	Structure	Type	Weir Crest Elevation	Operating Elevations Feet NAVD 88			
				Wet Season		Dry Season	
			Feet NAVD 88	Open at	Close at	Open at	Close at
1	Golden Gate Canal Weir #1	Movable Crest Weir	0.70/2.05	2.55	1.20	2.55	1.45
2	Golden Gate Canal Weir #2	Fixed Crest with 2 Gates	3.70	4.20	3.70	4.70	3.95
3	Golden Gate Canal Weir #3	Fixed Crest with 2 Gates	6.20	6.70	6.20	7.20	6.45
4	Golden Gate Canal Weir #4	Fixed Crest with 2 Gates	8.20	8.70	8.20	9.20	8.45
5	Golden Gate Canal Weir #5	Fixed Crest with 2 Gates	9.20	9.70	9.20	10.20	9.45
6	Golden Gate Canal Weir #6	Fixed Crest with V-Notch	10.80	11.30	10.80	11.80	11.05
7	Golden Gate Canal Weir #7	Fixed Crest with V-Notch	11.80	12.30	11.80	12.80	12.05
8	I-75 Canal Weir #1	Fixed Crest with 1 Gate	4.90	5.40	4.90	5.90	5.15
9	I-75 Canal Weir #2	Fixed Crest with 2 Gates	6.70	7.20	6.70	7.70	6.95
10	I-75 Canal Weir #3	Fixed Crest with 2 Gates	8.70	9.20	8.70	9.70	8.95
11	Cypress Canal Weir 4A1	Fixed Crest with 2 Gates	8.20	8.70	8.20	9.20	8.45
12	Airport Road Canal North	Amil Gate	7.20	6.20		7.20	
13	Airport Road Canal South	Amil Gate	7.20	6.20		7.20	
14	Faka Union Canal Weir #1	Fixed Crest	0.70				
15	Faka Union Canal Weir #2	Fixed Crest with Steel Gates	2.57	4.90	3.90	4.90	4.40
16	Faka Union Canal Weir #3	Fixed Crest with V-Notch	4.89	5.39	4.89	5.89	5.14
17	Faka Union Canal Weir #4	Fixed Crest with Steel Gates	7.91	10.21	9.21	11.21	10.21
18	Faka Union Canal Weir #5	Fixed Crest Sheet Pile Weir	10.70	12.20	10.70	12.70	11.70
19	Faka Union Canal Weir #6	Fixed Crest with V-Notch	13.20	13.70	13.20	14.20	13.45
20	Faka Union Canal Weir #7	Fixed Crest with V-Notch	15.40	15.90	15.40	16.40	15.65
21	Miller Canal Weir #1	Fixed Crest with Steel Gates	2.85	3.70	2.70	3.70	3.20
22	Miller Canal Weir #2	Fixed Crest with V-Notch	4.89	5.39	4.89	5.89	5.15
23	Miller Canal Weir #3	Fixed Crest with V-Notch	9.20	9.20	8.20	9.20	8.70
24	Lucky Lake Weir	Fixed Crest with 2 Steel Gates	3.20	5.70	5.20	8.50	8.00
25	Merritt Canal Weir #1	Adjustable Concrete Blocks	7.72	4.20	2.70	5.20	4.20

Table A-5 continued - Basic Operating Schedule – Big Cypress Basin Water Control Structures							
Serial #	Structure	Type	Weir Crest	Operating Elevations Feet NAVD 88			
			Elevation	Wet Season		Dry Season	
			Feet NAVD 88	Open at	Close at	Open at	Close at
26	Prairie Canal Weir #1	Adjustable Steel Plates	7.75	4.20	2.70	5.20	4.20
27	Henderson Creek Weir #1	Gated Spillway	3.70	3.70	3.20	4.70	4.20
		Flap Gate	-0.80	4.45	4.20	4.45	4.20
		East Side Channel	2.22	3.70	2.70	4.70	4.20
		West Side Channel	2.15	3.20	2.15	3.70	3.20
28	Cocohatchee Canal Weir #1	Gated Spillway	5.20	4.70	3.20	4.90	3.90
29	Cocohatchee Canal Weir #2	Gated Spillway	8.70	7.20	6.20	8.20	7.20
30	Cocohatchee Canal Weir #3	Gated Spillway	10.70	10.20	8.70	10.50	9.50
31	S.R. 29 Canal Weir #1	Fixed Crest with Removable Steel Sheet	1.91*	1.41	-0.09	1.91	0.91
32	S.R. 29 Canal Weir #2	Fixed Crest with Removable Steel Sheet	2.26*	1.76	0.26	2.26	1.26
33	S.R. 29 Canal Weir #3	Fixed Crest with Removable Steel Sheet	4.14*	3.64	2.14	4.14	3.14
34	S.R. 29 Canal Weir #4	Fixed Crest with Removable Steel Sheet	6.61*	6.11	4.61	6.61	5.61
35	S.R. 29 Canal Weir #5	Fixed Crest with Removable Steel Sheet	9.92*	9.42	7.92	9.92	8.92
36	S.R. 29 Canal Weir #6	Fixed Crest with Removable Steel Sheet	10.10*	9.60	8.10	10.10	9.10
37	S.R. 29 Canal Weir #6A	Gated Weir	9.70	9.20	8.20	9.70	9.20
38	S.R. 29 Canal Weir #6B	Gated Weir	9.70	9.20	8.20	9.70	9.20
39	S.R. 29 Canal Weir #7	Fixed Crest with Removable Steel Sheet	9.84*	9.34	7.84	9.84	8.84
40	S.R. 29 Canal Weir #8	Fixed Crest with Removable Steel Sheet	10.63*	10.13	8.63	10.63	9.63

*Elevation of top of concrete headwall, not weir crest

Table A-6 – Canal and River Manning’s n Values

River	Chainage (ft)	Manning's n	River	Chainage (ft)	Manning's n
AirportRdN	1,568	0.035	CorkScrewCan	2,943	0.035
AirportRdN	11,566	0.035	CorkScrewCan	32,856	0.035
AirportRdS	0	0.035	CorkscrewN	0	0.050
AirportRdS	28,259	0.035	CorkscrewN	27,488	0.050
BirdRookry	0	0.667	CorkscrewS	0	0.667
BirdRookry	33,548	0.667	CorkscrewS	36,757	0.667
BonBeach	0	0.040	CorkscrewNE	0	0.050
BonBeach	22,937	0.040	CorkscrewNE	19,817	0.050
C1-connector	0	0.035	CorkscrewSE	0	0.500
C1-connector	8,534	0.035	CorkscrewSE	35,579	0.500
CocohatcheeEast	0	0.035	CorkTribCan	0	0.035
CocohatcheeEast	10,138	0.035	CorkTribCan	7,218	0.035
CocohatcheeWest	0	0.035	CR951	0	0.035
CocohatcheeWest	57,418	0.035	CR951	38,742	0.035
CocohatcheeWest	60,699	0.100	CurryCan	0	0.035
CocohatcheeWest	62,664	0.200	CurryCan	10,539	0.035
Connection7	0	0.035	CypressCan	0	0.035
Connection7	394	0.035	CypressCan	41,390	0.035
Connection8	0	0.035	EastCan	0	0.500
Connection8	394	0.035	EastCan	19,007	0.200
Cork2	0	0.035	Fakahatchee Strand	0	0.500
Cork2	10,014	0.035	Fakahatchee Strand	162,971	0.500
CorkIrrCan1	0	0.050	FakaUnionCan	0	0.035
CorkIrrCan1	12,865	0.050	FakaUnionCan	174,516	0.035
CorkIrrCan2	0	0.050	GoldenGateBr	0	0.035
CorkIrrCan2	14,774	0.050	GoldenGateBr	7,792	0.035
CorkIrrCan3	0	0.050	GoldenGate Main	0	0.035
CorkIrrCan3	10,440	0.050	GoldenGate Main	95,149	0.035
Corkscrew	17,032	0.500	GoldenGate Main	96,255	0.029
Corkscrew	98,151	0.500	GoldenGate Main	111,977	0.029
Corkscrew	103,545	0.200	GoldenGate Main	113,195	0.029
Corkscrew	121,509	0.200	GoldenGate Main	150,034	0.029
GrMeadows	0	0.125	ImmokaleeS	0	0.500
GrMeadows	103,355	0.200	ImmokaleeS	41,019	0.500

Table A-6 Continued– Canal and River Manning's n Values

River	Chainage (ft)	Manning's n	River	Chainage (ft)	Manning's n
GrMeadows	103,699	0.200	Imperial	0	0.100
GrMeadowsS	0	0.333	Imperial	41,173	0.100
GrMeadowsS	17,356	0.333	ImpTrib75	0	0.067
HarveyCan	0	0.035	ImpTrib75	3,041	0.067
HarveyCan	27,816	0.035	KehlCan	0	0.040
HendersonCr	5,282	0.040	KehlCan	31,101	0.040
HendersonCr	19,686	0.040	MerrittCan	0	0.035
HendersonCr	40,934	0.050	MerrittCan	71,345	0.035
HendersonStrand	0	0.333	MillerCan	0	0.035
HendersonStrand	42,653	0.200	MillerCan	91,304	0.035
HendersonStrand	46,918	0.100	OakCreek	0	0.067
HendersonStrand	65,213	0.100	OakCreek	11,871	0.067
I-75Can	0	0.035	OkaloaCon	0	0.333
I-75Can	40,071	0.035	OkaloaCon	13,032	0.333
I75N-1	0	0.035	Orange	0	0.035
I75N-1	4,265	0.035	Orange	10,558	0.035
I75N-2	0	0.035	OrangeCreek	0	0.067
I75N-2	9,843	0.035	OrangeCreek	0	0.035
I75N-3	0	0.035	OrangeCreek	8,455	0.067
I75N-3	10,171	0.035	OrangeCreek	8,455	0.035
I75N-4	0	0.035	PrairieCan	0	0.035
I75N-4	9,843	0.035	PrairieCan	55,964	0.035
I75S-1	0	0.035	SR29	0	0.064
I75S-1	4,265	0.035	SR29	207,149	0.064
I75S-2	0	0.035	StumpyStrand	1,831	0.500
I75S-2	9,843	0.035	StumpyStrand	78,728	0.500
I75S-3	0	0.035	WestCan	0	0.500
I75S-3	10,171	0.035	WestCan	36,872	0.200
I75S-4	0	0.035			
I75S-4	9,843	0.035			

Table A-7. Soil Profile Definition and Soil Parameters

Profile No. and MSHE Code	Soil Type and Depth	Saturated Hydraulic Conductivity K_s [m/s]	Saturated Water Content Θ_s	Water Content at Field Capacity Θ_{fc}	Water Content at Wilting Point Θ_w	Residual Water Content Θ_r
1	Immokalee A1 (0.0-0.1 m)	2.0e-4	0.42	0.15	0.013	0.01
	Immokalee AE (0.1-0.23 m)	1.1e-4	0.42	0.15	0.02	0.031
	Immokalee E1 (0.23-0.41 m)	8.6e-5	0.39	0.14	0.02	0.015
	Immokalee E2 (0.41-0.91 m)	1.0e-4	0.38	0.14	0.01	0.01
	Immokalee Bh1(0.91-1.27 m)	1.2e-6	0.38	0.33	0.057	0.031
	Immokalee Bh2 (1.27-1.4 m)	6.1e-6	0.38	0.28	0.05	0.043
	Immokalee Bw/Bh (1.4-30 m)	7.5e-5	0.38	0.20	0.03	0.02
2	Boca A (0.0-0.08 m)	1.1e-4	0.487	0.11	0.04	0.029
	Boca E1 (0.08-0.23 m)	9.7e-5	0.46	0.11	0.034	0.023
	Boca E2 (0.23-0.36 m)	8.0e-5	0.408	0.09	0.024	0.015
	Boca Bw (0.36-0.64 m)	5.4e-5	0.396	0.10	0.009	0.006
	Boca Btg (0.64-30 m)	8.3e-7	0.347	0.33	0.122	0.071
3	Riviera Ap (0-0.15 m)	1.2e-6	0.38	0.23	0.049	0.031
	Riviera A (0.15-0.28 m)	4.2e-5	0.52	0.22	0.047	0.02
	Riviera E1 (0.28-0.41 m)	5.0e-5	0.46	0.12	0.022	0.01
	Riviera E2 (0.41-0.64 m)	5.5e-5	0.4	0.06	0.003	0.001
	Riviera Bw (0.64-0.74 m)	3.5e-5	0.38	0.06	0.004	0.001
	Riviera Btg (0.74-30 m)	2.5e-7	0.38	0.32	0.102	0.08
4	Sanibel Oa1 (0-0.12 m)	2e-5	0.752	0.72	0.207	0.2
	Sanibel Oa2 (0.12-0.15 m)	7.8e-5	0.73	0.69	0.205	0.1
	Sanibel A1 (0.15-0.23 m)	9.4e-5	0.51	0.39	0.025	0.01
	Sanibel A2 (0.23-0.3 m)	1.7e-4	0.41	0.17	0.013	0.01
	Sanibel C1 (0.3-0.66 m)	1.4e-4	0.37	0.09	0.013	0.01
	Sanibel C2 (0.66-30 m)	1.1e-4	0.38	0.08	0.011	0.01
5	Winder A1 (0.0-0.08 m)	3.6e-5	0.374	0.26	0.024	0.014
	Winder E (0.08-0.33 m)	5.7e-5	0.37	0.15	0.008	0.004
	Winder B/E (0.33-0.41 m)	1.6e-6	0.328	0.23	0.048	0.027
	Winder Btg (0.41-0.58 m)	7.4e-6	0.43	0.40	0.153	0.101
	Winder BCg (0.58-0.74 m)	7.4e-6	0.34	0.26	0.05	0.028
	Winder C1 (0.74-0.89 m)	4.1e-6	0.332	0.27	0.038	0.021
	Winder C2 (0.89-1.04 m)	5.0e-6	0.347	0.23	0.042	0.024
	Winder C3 (0.89-30 m)	1.9e-6	0.355	0.31	0.107	0.062
6	Plantation Oap (0-0.23 m)	1.6e-4	0.86	0.56	0.164	0.1
	Plantation A/E (0.23-0.48 m)	8.4e-5	0.491	0.19	0.029	0.022
	Plantation Bw (0.48-30 m)	1.2e-4	0.392	0.10	0.003	0.002

Table A-8. Correlation between landscape type and associated soil type.

Vegetation Code*	Vegetation Type**	MSHE Code	Soil Name
15	Xeric Flatwood	1	Immokalee
16	Xeric Hammock		
8	Mesic Flatwood and Mesic Hammock North portion		
4	Hydric Flatwood and Hydric Hammock North portion		
99	XX		
3	Disturbed		
9	Mesic Flatwood and Mesic Hammock South portion	2	Boca
5	Hydric Flatwood and Hydric Hammock South portion		
14	Wet Prairie South portion		
10	Dwarf Cypress and Scrub Cypress		
2	Cypress South portion		
14	Wet Prairie North portion	3	Riviera
11	Swamp Forest North portion	4	Sanibel
7	Marsh		
13	Open Water		
6	Mangrove		
2	Cypress North portion	5	Winder
11	Swamp Forest South portion	6	Plantation
12	Tidal Marsh		
1	Beach		

* The vegetation code refers to the pre-development vegetation map prepared by the SFWMD, 2003. ** North and South portions refer to a line dividing southwest Florida delineated by the SFWMD.

Table A-9. Hydro-Geological Parameters in the BCB Model

Model layer	Horizontal K (m/s)	Vertical K (m/s)	Specific Yield (-)	Storage Coeff. (1/m)
1	$5 \cdot 10^{-8} - 3.9 \cdot 10^{-2}$	$2.3 \cdot 10^{-10} - 1 \cdot 10^{-3}$	0.099 - 0.2	$9.9 \cdot 10^{-6} - 1 \cdot 10^{-5}$
2	$9.7 \cdot 10^{-11} - 0.01$	$9.7 \cdot 10^{-11} - 7 \cdot 10^{-5}$	0.1 - 0.2	$9.9 \cdot 10^{-6} - 1 \cdot 10^{-5}$
3	$1.4 \cdot 10^{-6} - 2.8 \cdot 10^{-3}$	$6.2 \cdot 10^{-9} - 1.8 \cdot 10^{-5}$	0.2	$9.9 \cdot 10^{-6} - 1 \cdot 10^{-5}$

Table A-10 List of Model Input and Parameters for MIKE SHE

Model Component	Model Input	Model Parameters
MIKE SHE SZ Saturated zone flow	Geological model (lithological information Boundary conditions Drainage depth (drain maps) Wells and withdrawal rate	K_h , Horizontal hydraulic conductivity K_v , Vertical hydraulic conductivity S , confined storage coefficient S_u , unconfined storage coefficient Drainage time constant
MIKE SHE UZ Unsaturated zone flow	Map of characteristic soil types Hydraulic Conductivity Curves Retention curves	K_s , saturated hydraulic conductivity θ_s Saturated water content θ_{res} Residual water content θ_{eff} Effective saturation water content p_{Fc} , Capillary pressure at field capacity p_{Fw} , Capillary pressure at wilting point n , Exponent of hydraulic conductivity curve
MIKE SHE ET Evapotranspiration	Time series of vegetation Leaf Area Index Time series of vegetation root depth	C_1, C_2, C_3 : Empirical parameters C_{int} : Interception parameter A_{root} : Root mass parameter K_c : Crop coefficient
MIKE SHE OC Overland and river/canal flow (MIKE11)	Topographical map Boundary conditions Digitized river/canal network River/canal cross sections	M , Overland Manning no. D , Detention storage L , leakage coefficient M , River/canal Manning no.
MIKE SHE IRR Irrigation module	Irrigated areas Irr. sources (pumps/canals/reservoirs) Distribution method (sheet, sprinkler, drip) Source capacity	E_{act}/E_{pot} , crop water stress factor (target ratio between actual and potential evapotranspiration rates) Well threshold

Table A-11 Primary Parameters Adjusted During Calibration

Model component	Calibration parameters	Parameter range
MIKE SHE SZ – Saturated zone flow	K_v : Vertical hydraulic conductivity (m/s) K_H/K_v Drainage time constant (s^{-1}) Drain level (m) Boundary head conditions: Northern Boundary (-) Eastern Boundary Tidal Boundary	$9.7 \cdot 10^{-11}$ - $1 \cdot 10^{-3}$ 1 - 1000 $2.9 \cdot 10^{-6}$ - 0.00 -1.62 – 13.30 Time Varying No Flow Fixed Head
MIKE SHE OC – Overland and river/canal flow (MIKE11)	M, Overland Manning no. $m^{1/3}/s$ D, Detention storage (mm) L, leakage coefficient (s^{-1}) Canal M (Reverse of Manning's n) ($m^{1/3}/s$) Floodplains M ($m^{1/3}/s$)	0 - 2 50 - 100 $9.9 \cdot 10^{-7}$ – $9.9 \cdot 10^{-5}$ 2 - 35 2 - 35

Table A-12 Groundwater Model Errors at Various Stations During Calibration

BCB 2003		
Well	Plot no.	Abs mean error [ft]
c-1079	1	3.004
c-1004	2	1.673
c-1064	3	0.866
c-1071	4	1.573
c-1072	5	2.069
c-131	6	1.753
c-296	7	0.617
c-391	8	0.503
c-392	9	0.472
c-460	10	1.059
c-462	11	NA
c-492	12	0.350
c-496	13	0.085
c-503	14	0.156
c-531	15	0.408
c-598	16	0.217
c-599	17	NA
c-600	18	1.853
c-690	19	0.428
c-951	20	1.606
c-953	21	0.466
c-968	22	0.762
c-969	23	0.165
c-988	24	0.043
FP2	25	6.568
FP3	26	0.244
FP4	27	0.078
Hpot_49_GW1	28	0.029
Hpot_49_GW10	29	0.771
Hpot_49_GW11	30	2.038
Hpot_49_GW12	31	1.251
Hpot_49_GW13	32	3.536
Hpot_49_GW14	33	0.090
Hpot_49_GW15	34	1.891
Hpot_49_GW3	35	NA
Hpot_49_GW5	36	1.030
Hpot_49_GW6	37	0.644
Hpot_49_GW7	38	0.513
Hpot_49_GW8	39	0.193
Hpot_49_GW9	40	0.847
Hpot_49L_GW1	41	0.563
L_2194	42	2.446
L-2195	43	0.485

Table A-12 Continued Groundwater Model Errors at Various Stations During Calibration

Well	Plot no.	Abs mean error [ft]
L-731	44	4.739
Fakahatchee_well_data_NW_2	45	0.757
Fakahatchee_well_data_NW_4	46	0.120
Fakahatchee_well_data_NW_8	47	0.942
Fakahatchee_well_data_NW_10	48	0.910
Fakahatchee_well_data_NE_2	49	0.811
Fakahatchee_well_data_NE_4	50	0.135
Fakahatchee_well_data_NE_6	51	0.005
Fakahatchee_well_data_NE_8	52	0.011
Fakahatchee_well_data_SW_2	53	0.548
Fakahatchee_well_data_SW_4	54	0.231
Fakahatchee_well_data_SW_6	55	0.168
Fakahatchee_well_data_SW_10	56	1.071
Fakahatchee_well_data_SE_2	57	1.407
Fakahatchee_well_data_SE_4	58	1.168
Fakahatchee_well_data_SE_8	59	0.445
Fakahatchee_well_data_SE_10	60	0.626
Count:		57

Average of mean error 1.008

Table A-13 Surface Water Model Errors for the Canal/River Staff Gages and Flows at Various Stations During Calibration

Station (ft)	ME	MAE	RMSE	STDres	R	Nash_Sut
L Trafford	0.044	0.194	0.260	.0256	0.934	0.845
Imperial	0.087	0.684	0.996	0.993	0.917	0.839
Keas846	0.359	0.461	0.539	0.402	0.861	0.426
Cork	-0.571	0.574	0.826	0.596	0.964	0.143
Faka Union 4H	-0.916	1.343	1.638	1.358	0.698	0.111
Faka Union 1H	-0.260	0.313	0.406	0.312	0.861	0.553
Merritt I-75	ND	ND	ND	ND	ND	ND
BCYPR7*	0.515	0.719	1.016	0.876	0.708	0.329
Barron River	-0.370	0.754	1.323	1.270	0.386	0.062
GG Main #5_H	0.0467	0.131	0.220	0.215	0.512	0.686
GG Main W4_H	-0.356	0.440	0.649	0.543	0.764	0.402
GG Main #3_H	-0.295	0.532	0.724	0.661	0.813	0.560
GG Main #3_T	0.061	0.295	0.403	0.399	0.877	0.748
GG Main CR951	0.309	0.391	0.510	0.406	0.839	0.474
GG Main #2_H	0.147	0.292	0.398	0.370	0.797	0.501
0.208163	0.208	0.361	0.482	0.435	0.722	-0.004
GG CR 846	0.00582	0.476	0.615	0.615	0.761	0.577
I-75 Canal D2-8-H	-0.522	0.554	0.856	0.678	0.399	-0.356
Coco CR 951	0.561	0.707	0.842	0.628	0.845	0.480
Coco #2 H	0.561	0.707	0.842	0.628	0.845	0.480
Coco #2_T	-0.328	0.817	2.689	2.669	0.606	-4.52
Coco #1_H	-0.179	0.359	1.569	1.558	0.0546	-18.13
Coco #1	-0.220	0.600	1.690	1.675	-0.037	-3.75
Coco #1_T	-0.012	0.562	1.135	1.135	0.383	-2.25
Henderson US 41	0.053	1.225	1.503	1.502	0.528	0.273
FLOW STATIONS	ME, cfs					
Imperial River	-54.5	81.0	142.4	131.6	0.90	0.70
Faka Union #1	-35.0	136.1	191.5	188.3	0.91	0.82
GG Main #1	40.4	136.6	207.9	203.9	0.90	0.80
Coco #2	-28.5	60.6	84.4	79.4	0.80	0.56
Coco #1	-76.9	79.6	110.8	79.7	0.84	-1.20

Table A-14 Hourly rainfall stations used to develop the synthetic hourly rainfall data from the daily station data in 1995.

1995	
Hourly Station	Daily Station
BCB Field Station	Conservancy - 10 Marco Island Firestation -11 BCB Field Station -12
Collier WWTP	Bonita Springs - 01 CorkWTP - 03 Lehigh Acres WTP - 07
Golden Gate at I-75	Corkscrew HQ - 02 Immokalee - 06 Collier Seminole - 13 Immokalee Landfill - 16 Miles City Tower - 17 Silver Strand - 18 Everglades City - 20

Table A-15 Hourly rainfall stations used to develop the synthetic hourly rainfall data from the daily station data in 1999.

1999	
Hourly Station	Daily Station
Coco1	Bonita Springs - 01 Corkscrew WTP - 03 Lehigh Acres WTP - 07 BCB Field Station - 12
Golden Gate Firestation	Corkscrew - 02 Immokalee - 06 Immokalee Landfill - 16
Courthouse	Conservancy - 10 Marco Island Firestation -11
Golden Gate at I-75	Collier Seminole - 13 Immokalee Landfill - 16 Miles City Tower - 17 Silver Strand - 18 Everglades City - 20

Table A-16 Observed rainfall amounts for tropical storms Jerry and Harvey

Station	Tropical Storm Jerry (1995)	Tropical Storm Harvey (1999)
BCB Fieldstation	9.41	7.05
BCB Fieldstation (hourly)	9.12	NA
Bonita Springs	7.55	7.05
Bonita Springs (hourly)	NA	7.5
Coco 1	NA	NA
Collier County	13.83	8.83
Collier Seminole	8.13	7.34
Collier WWTP (hourly)	9.13	1.37
Conservancy	9.41	8.4
Corkscrew	8.88	5.31
Corkscrew WTP	7.46	4.69
Courthouse (hourly)	NA	NA
Everglades City	13.59	8.72
Ft. Myers	8.68	8.83
Ft. Myers	6.31	8.83
Golden Gate at I-75 (hourly)	10.04	11.45
Golden Gate Firestation	9.4	NA
Golden Gate Fire Station (hourly)	NA	7.4
Immokalee	6.66	7.45
Immokalee Landfill	6.6	8.5
LakesPK	8.68	5.74
Lehigh Acres WTP	5.77	NA
Lfas	6	8.5
Marco Island Firestation	10.34	7.8
Miles City Tower	9.4	8.2
RSW Airport	3.75	8.83
Silver Strand	9.87	8.1
Minimum for Stations with Rainfall	3.75	1.37
Maximum for Stations with Rainfall	13.83	11.45

Table A-17 Statistical validation measurements for the 1995 Tropical Storm Jerry

	<i>Data Type</i>	<i>ME</i>	<i>RMSE</i>	<i>Correlation</i>
Lk_Trafford	Stage	0.28	0.40	0.87
Imperial1	Stage	-0.06	1.30	0.90
Keais846	Stage	0.32	0.50	0.92
FAKA1-H Hourly	Stage	-0.27	0.32	0.97
FU4-H	Stage	NA	NA	NA
BCYPR7	Stage	1.65	1.81	0.75
Barron River	Stage	-0.29	0.44	0.90
GG#5-H	Stage	-0.07	0.51	0.48
GOLD_W4_H	Stage	-0.30	0.57	0.76
GG#3-H	Stage	0.15	0.42	0.88
GG#3-T	Stage	0.03	0.52	0.93
GG-CR951	Stage	0.04	0.47	0.92
GG#2-H	Stage	0.06	0.45	0.91
GG#1-H (Goldw1) Hourly	Stage	0.00	0.50	0.91
GG-CR846	Stage	-0.54	0.73	0.84
D2-8-H	Stage	-0.53	1.01	0.23
Coco.CR951	Stage	0.32	0.77	0.86
COCO#1 Hourly	Stage	-1.36	3.10	-0.20
Coco#1-T	Stage	-0.20	0.64	0.84
Imperial	Flow	-115	300	0.85
FU#1 (FAKA1) Hourly	Flow	-35	181	0.96
GG#1 (Goldw1) Hourly	Flow	94	501	0.83
COCO1 Hourly	Flow	-199	230	0.81

Table A-18 Statistical validation measurements for the 1999 Tropical Storm Harvey

	<i>Data Type</i>	<i>ME</i>	<i>RMSE</i>	<i>Correlation</i>
Lk_Trafford	Stage	0.31	0.42	0.75
Imperial1	Stage	0.61	1.35	0.85
Keais846	Stage	0.42	0.53	0.86
FAKA1-H Hourly	Stage	-0.13	0.27	0.90
FU4-H Hourly	Stage	-0.19	1.36	-0.17
BCYPR7 Hourly	Stage	-0.12	0.28	0.93
Barron River	Stage	0.40	0.79	0.65
GG#5-H	Stage	0.03	0.27	0.43
GOLD_W4_H	Stage	-0.10	0.38	0.63
GG#3-H	Stage	0.14	0.44	0.73
GG#3-T	Stage	-0.08	0.58	0.84
GG-CR951	Stage	0.39	0.65	0.83
GG#2-H	Stage	0.13	0.48	0.82
GG#1-H (Goldw1) Hourly	Stage	0.05	0.46	0.78
GG-CR846	Stage	0.06	0.62	0.32
D2-8-H	Stage	-0.20	0.48	0.37
Coco.CR951	Stage	0.82	0.91	0.35
COCO#1 Hourly	Stage	-0.63	0.91	0.16
Coco#1-T	Stage	0.05	0.63	0.39
Imperial	Flow	-46	193	0.73
FU#1 (FAKA1) Hourly	Flow	64	167	0.95
GG#1 (Goldw1) Hourly	Flow	181	345	0.81
COCO1 Hourly	Flow	-139	185	0.19

Table A-19 - Optimum Canal Stages Upstream of the Miller, Faka Union and Merritt Canal Pump Stations

Optimum Canal Stages		
Project Feature Name	Dry Season Optimum Stage (ft, NAVD 88)	Wet Season Optimum Stages (ft, NAVD 88)
Miller Canal	7.2	4.9
Faka Union Canal	7.2	4.9
Merritt Canal	8.0	5.2

Table A-20 – Miller, Faka Union and Merritt Canal Pump Stations Operations

Summary of Pump Station Operations				
Pump Station	Pump Turn On Stage (ft, NAVD 88) at Upstream Gage		Upstream Distance to Upstream Gage (miles)	Pumping Capacity, Minimum & Maximum (cfs)
	<u>Wet Season</u>	<u>Dry Season</u>		
Miller Canal Pump Station	≥ 4.9	≥ 7.2	3.0	100 – 1250
Faka Union Canal Pump Station	≥ 4.9	≥ 7.2	2.9	125 – 2630
Merritt Canal Pump Station	≥ 5.2	≥ 8.0	1.5	80 - 800

Table A-21 – Private Lands Levee (PL Levee) Pump Stations Operations

PL Levee Pump Station Operations				
Pump Station Name	Pump Turn on Stage (ft, NAVD 88) in levee borrow canal		Pumping Capacity, Minimum Maximum (cfs)	
	<u>Flood Control</u>	<u>Seepage Control</u>	<u>Flood Control</u>	<u>Seepage Control</u>
PL Levee Interior Drainage Pump Station	≥ 8.5	≥ 7.8	50 – 100	50

Table A-22 – Summary of New FU-4 Operations

Summary of New FU-4 Structural Operations				
Structure Name	Stage (ft, NAVD 88) at Upstream gage when Gates Open		Stage (ft, NAVD 88) at Upstream gage when Gates Close	
	<u>Wet Season</u>	<u>Dry Season</u>	<u>Wet Season</u>	<u>Dry Season</u>
FU-4 New	> 11.3	>12.2	11.3	11.4