Bringing ideas to life

HYDROLOGY

Breede and Goutitz WMA Estuaries

aurecon

Overview

- WRSM 2012
- Pitman
- Several updates
- Latest (1920-2009)
- Used for the Breede-Gouritz RQO
- Calibration
- Parameter transfer

RDM vs WRSM2012

- Discrepancies between earlier hydrology produced by Denis Hughes (Spatsim)
- Used in RDM (Barry Clark)
- Compared MAR
- Identified differences
- Re-visited each estuary
- Decision (WRSM,RDM,Redo)
- RC Google Reports
- Discuss each estuary

	NATURAL MAR (Mm3)			CURRENT DAY (Mm3)		
	WRSM	RDM		WRSM	RDM	
Palmiet	253.7	256.3	Natural is similar the same so use WR2012	177.9	163.7	The calibration at G4H007 at the lower end of the Palmiet shows the simulated flows as too low. RDM is even lower. Use WR2012
Bot	95.0	89.0	RDM natural is more or less the same so use WR2012. Calib shows WR2012 simulated less than observed so cannot reduce further.	77.7	72.0	WR2012 and RDM have same wateruse so %nMAR same. Use WR2012 current day as we used WR2012 natural.
Klein	63.7	53.4	Calibration shows WR2012 simulated less than observed so cannot reduce further.	51.2	40.9	WR2012 and RDM have same wateruse so %nMAR same (12-13Mm3). Use WR2012 current day as we used WR2012 natural.
Uilkraal	15.5	39.3	The RC from the quats alongside (G40L) is 10.6% and (G50A) is 7.7%. This compares well with the RC of Uilkraal (7.8%). Use WR2012.	6.8	**29.2**	Water use of WR2012 is about 7Mm3 RDM wateruse is about 10Mm3. Use WR2012 as %nMAR is allready low (50%).
Ratel	3.80					

Uilkraal vs Ratel

Gouritz	612.4	623.5	Natural MAR close enough	378.9	377.0	OK…. Water-use about the same (234 vs 247)
Duiwen hoks	88.8	89.3	Natural MAR close enough	81.6	72.9	BOCMA report (2016) only has total demand of 1.2Mm3 from Duivenhoks Dam (same as WR2012). Google shows irrigation of 6km2 with use of about 4Mm3. WR2012 has use of 7.2Mm3 which is close to my estimate. RDM water-use too high.
Goukou	110.5	116.0	Natural MAR close enough	89.9	91.7	OK…. Use about the same
Blinde	1.0	1.3	Use RDM as WR2012 RC too low (8%).	1.0	0.9	Use RDM as well as there are farm dams and Wr2012 has no demand on the dam.
Harten bos	5.1	4.6	Use WR2012	4.3	2.8	Current day use too low as Hartbeeskuil has no demand in Wr2012. Use RDM demands of 1.8Mm3 so current day is 3.3Mm3

Klein-Brak	39.3	50.7	Natural MAR may be too low as inflow to Klipheuwel only 1.4Mm3 (Cap=4.3Mm3 and BOCMA demand is 5.7Mm3). Runoff coefficient less than 15%.	35.5	37.7	Mossel Bay demand in WR2012 is 3.8Mm3 but only 1.4Mm3 supplied…inflow too low. Also about 5.5Km2 of irrigation suppling about 4Mm3 so total use is about 10Mm3. BOCMA is more accurate.
Groot-Brak	29.8	36.8	Nat MAT OK. Runoff coefficient 24% and inflow to Wolvedans is 22Mm2 (Cap is 24Mm3 and demand is 10Mm3)	18.0	16.3	Total demand of 11.8Mm3 makes sense (around 6Mm3 to Mossel Bay and 4Mm3 to Mosgas as well as about 2Mm3 irrigation). BOCMA is 13Mm3 so WR2012 about 2Mm3 short. RDM demand of 20Mm3 too high. Reduce current to 16.8Mm3.

Gwaing	53.8	26.6	WRSM Nat MAR is too high as RC is almost 50%. . Rather use RDM Nat MAR which gives RC of 25%	51.2	20.0	WRSM cur file is 51.2Mm3. So use of 2.5Mm3. About 1.5Mm3 short. RDM use of 6.6Mm3 too high. Factor current day to 22.6Mm3.
Kaaimans	48.7	39.5	Nat MAR is OK at 35% as 60% of catchment mountainous.	35.3	29.6	OK…. Use about the same as RDM
Wilderness	32.7	29.7	Nat MAR is OK at 26% as50% of catchment mountainous.	29.0	25.2	OK…. Use about the same as RDM. Google shows about 4-5Km2 irrigation using about 3Mm3.
Goukamma	52.9	57.5	Nat MAR is OK at about 23% as mnts about 20% of catchment.	46.2	48.8	Stay with WR2012 use of about 6Mm3…RDM use too high (9Mm3) although % of nMAR same.

Knysna	90.5	83.2	RDM may use smaller catchment identified at beginning of estuary. WR2012 uses up to estuary mouth	86.0	68.0	WR2012 does NOT have Knysna abstraction in configuration. Knysna use is 4Mm3 (BOCMA). WR2012 use is 4Mm3 for irrigation/forestry/AV. Actual use should be 8Mm3. RDM use of 15Mm3 too high. (factor current to 82 Mm3)
Noetsie	5.5	4.8	Similar…use WR2012	5.1	4.3	Similar…use WR2012
Piesang	6.9	5.2	K60G RC is 13% so allready low although RDM even lower so use WR2012	6.4	3.4	WR2012 demand on the Piesang is too low (0.5Mm3). Should be more like RDM demand of 1.8Mm3. Factor current day to 5.1Mm3.
Keurbooms	121.7	232.0	RC is very low (14%) based on calib end of K60A. Keep K60A/B/C same. Then increase K60D/E/F to 25% RC. So Estuary is 169Mm3. Increase WR2012 to 169Mm3.	106.8	215.0	Use of 15Mm3 same in Wr2012 and RDM. Factor current day to 154Mm3

Matjies	3.5	5.1	WR2012 RC too low (16%) Use RDM so increase natural to 5.1Mm3	3.2	4.3	Use of about 1Mm3…use RDM so increase WR2012 to 4.3Mm3
Sout(Oos)	4.8	11.2	Wr2012 RC too low (16%). Based on the Matjies RC the new natural should be 7Mm3….RDM too high	4.4	10.1	WR2012 use too small….approximately 1Mm3 used at Kurland so current should be 6Mm3. Same wateruse as RDM.
Bloukrans	34.1	40.1	Mistake in GH work…should be 39Mm3…use RDM.	31.4	39.3	Use RDM as google shows no irrigation and forestry has been cleared . WR2012 overestimates wateruse.
Groot (Wes)	11.9	12.8	WR2012 RC too low Use RDM. Scale up by 1.08	10.9	11.1	Use RDM so scale up by 1.02