Individual and coupled effects of future climate and land use scenarios on water balance components in an Australian catchment

Table S1. Land use proportions for LU0–4 in the Wooroloo Brook catchment, western Australia.

	LU0	LU1	LU2	LU3	LU4
FRST	50.6%	25.3%	26.8%	75.0%	50.6%
RNGE	48.9%	74.2%	48.9%	24.5%	19.4%
URBN	0.5%	0.5%	24.3%	0.5%	30.0%

Table S2. The parameters calibrated and ranked in this study for the SWAT model using SWAT–CUP in the Wooroloo Brook catchment, SWA.

Ranking	Adjustment and parameter name	Definition	Adjustment range	Calibrated range	Fitted value
1	R__CN2.mgt	SCS runoff curve number for moisture condition II	-0.25 to 0.35	-0.35 to 0.05	-0.16
2	V__GWQMN.gw	Threshold water level in shallow aquifer for base flow (mm)	0 to 3000	300 to 2500	2035
3	R__SOL_AWC(1).sol	Available water capacity of the soil layer	-0.3 to 0.4	-0.24 to 0.19	-0.19
4	V__ESCO.hru	Soil evaporation compensation factor	0 to 1	0.45 to 1	0.57
5	R__CANMX.hru	Maximum canopy storage	0 to 150	0 to 100	16.4
6	V__RCHRG_DP.gw	Deep aquifer percolation fraction	0 to 0.2	0 to 0.1	0.083
7	R__HRU_SLP.hru	Average slope steepness	-0.3 to 0.3	0.05 to 0.45	0.14
8	R__SLSUBBSN.hru	Average slope length	-0.25 to 0.6	-0.2 to 0.37	0.29
9	V__CH_K2.rte	Effective hydraulic conductivity of main channel	0 to 200	43.54 to 147.9	46.5
10	V__GW_REVAP.gw	Groundwater revap coefficient	0.02 to 0.2	0.025 to 0.11	0.076
11	V__REVAPMN.gw	Threshold depth of water in the shallow aquifer for revap to occur (mm)	0 to 500	0 to 287.4	275.5
12	V__GW_DELAY.gw	Groundwater delay (days)	0 to 150	0 to 31	3.37
13	R__SOL_AWC(2).sol	Available water capacity of the soil layer	-0.3 to 0.4	-0.12 to 0.31	0.19
14	R__OV_N.hru	Manning's n value for overland flow	-0.3 to 0.3	-0.14 to 0.17	0.094
15	V__SURLAG.bsn	Surface runoff lag time	0.05 to 6	2.14 to 5	2.84
16	R__SOL_Z(2).sol	Depth from soil surface to bottom of second soil layer	-0.1 to 0.1	-0.07 to 0.07	0.039
17	R__SOL_Z(1).sol	Depth from soil surface to bottom of first soil layer	-0.1 to 0.1	-0.11 to 0.03	0.006

18	V__CH_N2.rte	Manning's n value for the main channel	0.014 to 0.15	0.01 to 0.083	0.025
19	V__ALPHA_BNK.rte	Baseflow alpha factor for bank storage	0.03 to 0.9	0.15 to 0.7	0.16
20	V__EPCO.hru	Plant uptake compensation factor	0.3 to 1	0.48 to 0.83	0.57
21	V__ALPHA_BF.gw	Baseflow alpha factor (days)	0 to 0.5	0 to 0.7	0.54
22	V__CH_N1.sub	Manning's n value for the tributary channels	0.014 to 0.15	0.028 to 0.11	0.096

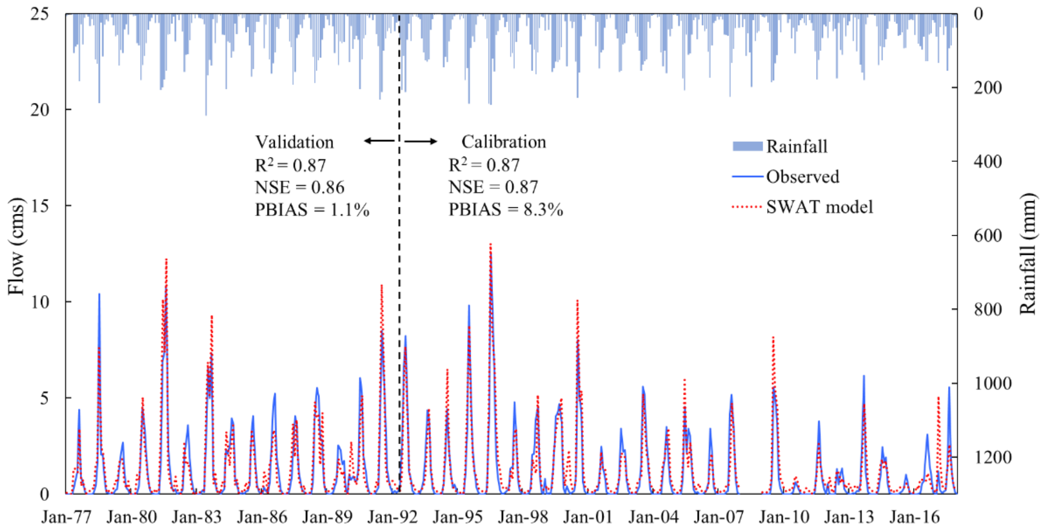

Figure S1. The simulated and observed monthly streamflow for calibration (January 1992 to December 2017, data for 2008 are missing) and validation (January 1977 to December 1991) in the Wooroloo Brook catchment, SWA.

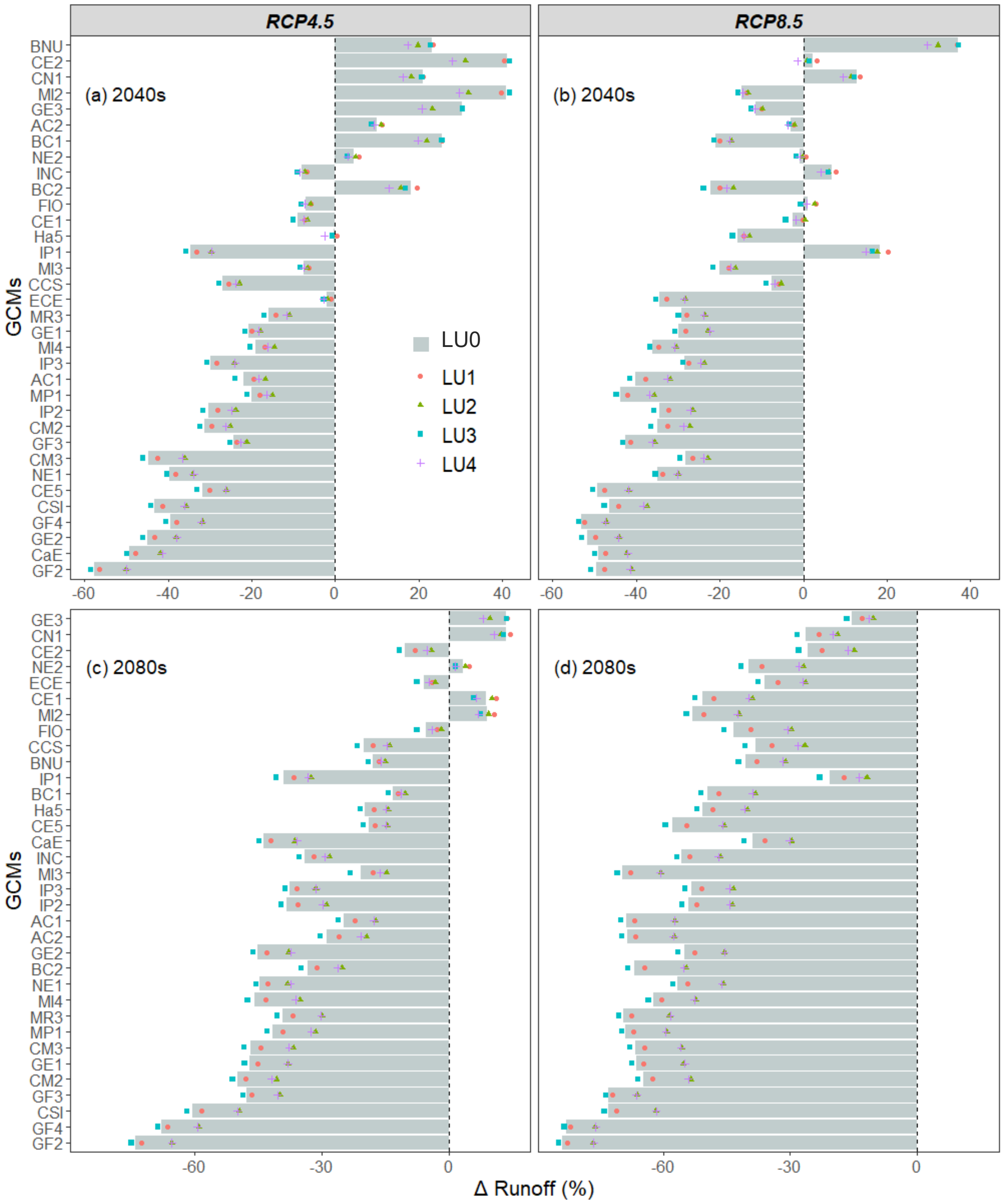

Figure S2. Projected changes in runoff (%) for 34 GCMs (RCP4.5 and RCP8.5) and LU0–4 in 2040s and 2080s compared to the baseline values at annual time scale. Data showed are changes in the 40–year average values for each of the 34 GCMs under different land use scenarios.

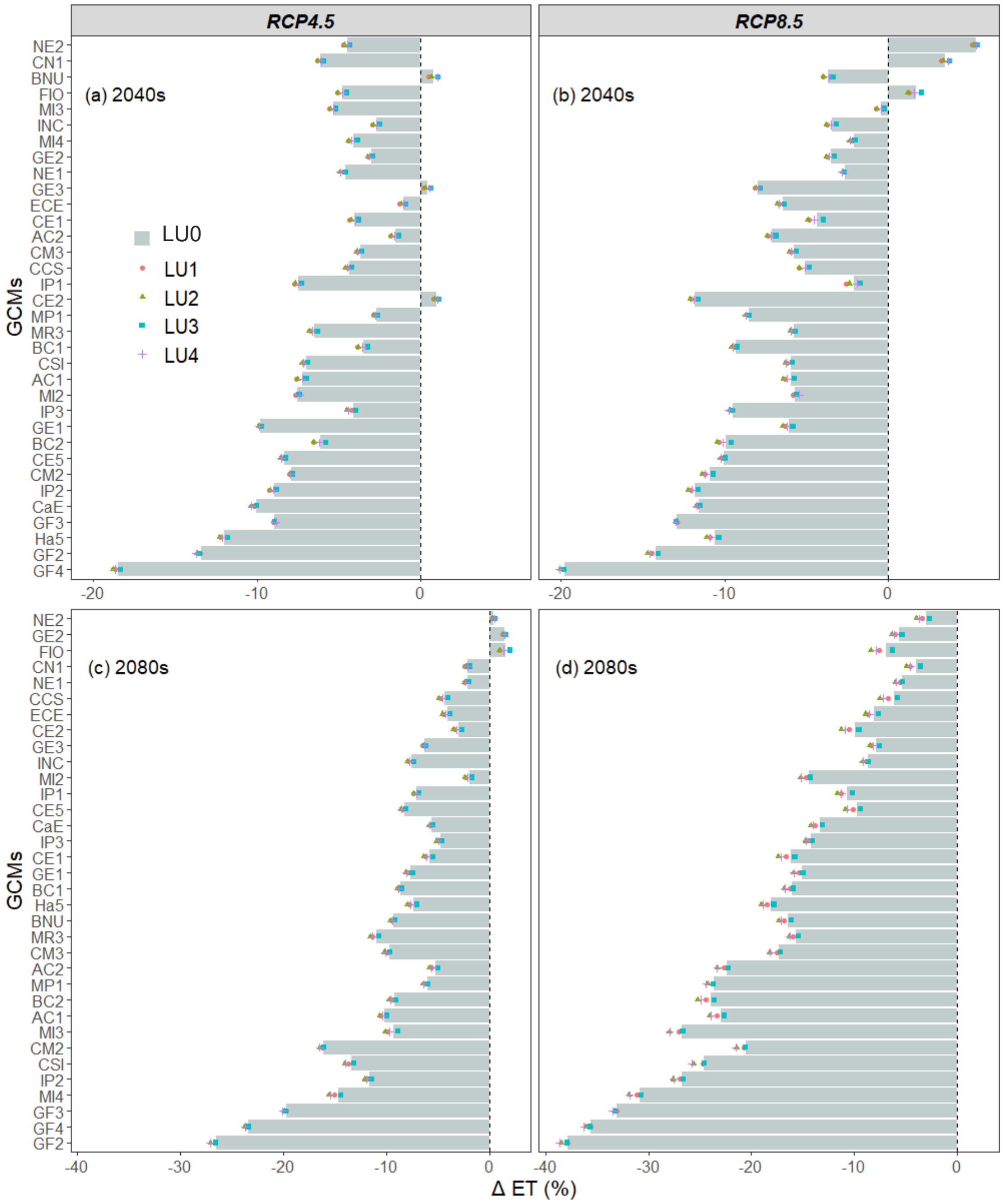

Figure S3. Projected changes in actual evapotranspiration (%) for 34 GCMs (RCP4.5 and RCP8.5) and LU0–4 in 2040s and 2080s compared to the baseline values at annual time scale. Data showed are changes in the 40–year average values for each of the 34 GCMs under different land use scenarios.

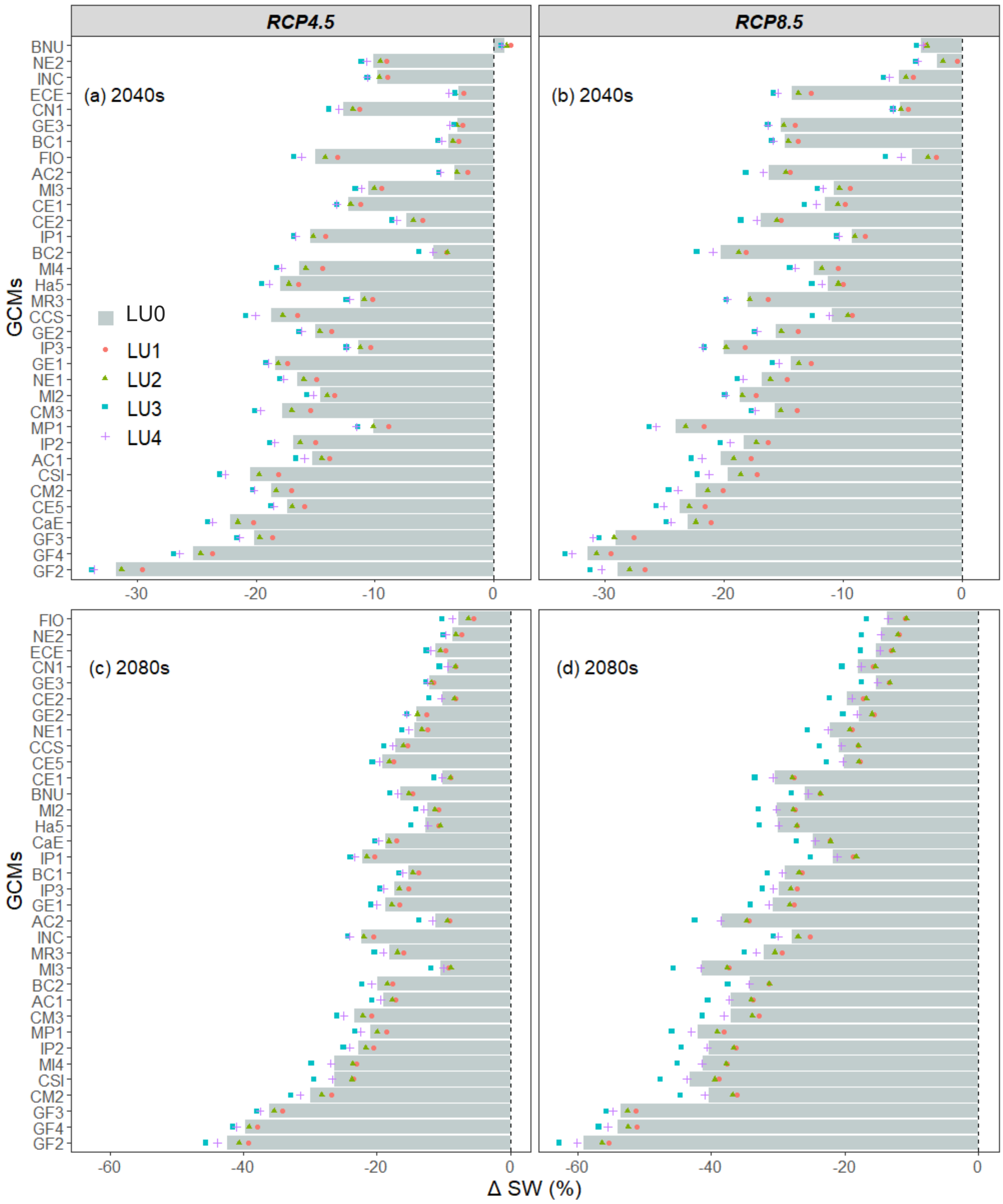

Figure S4. Projected changes in soil water (%) for 34 GCMs (RCP4.5 and RCP8.5) and LU0–4 in 2040s and 2080s compared to the baseline values at annual time scale. Data showed are changes in the 40–year average values for each of the 34 GCMs under different land use scenarios.