Assessing the impacts of climate change and water extraction on thermal stratification and water quality of a subtropical lake using the GLM-AED model

Chao Deng[a*], Hong Zhang[a], David P. Hamilton[b]

[a]School of Engineering and Built Environment, Griffith University, QLD 4222, Australia

[b]Australian Rivers Institute, Griffith University, QLD 4111, Australia

*Corresponding author:

E-mail address: chao.deng@griffithuni.edu.au (Chao Deng)

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Ta while the pink to blue colour bar presents a relative change range from -70% to 70% in rainfall and catchment hydrological outputs under future climate change.

Figure S1 Distribution of thermal stratification periods under baseline conditions and different future scenarios regarding warming temperatures, climate change, and increasing water demand over the baseline period from July 2011 to July 2019.

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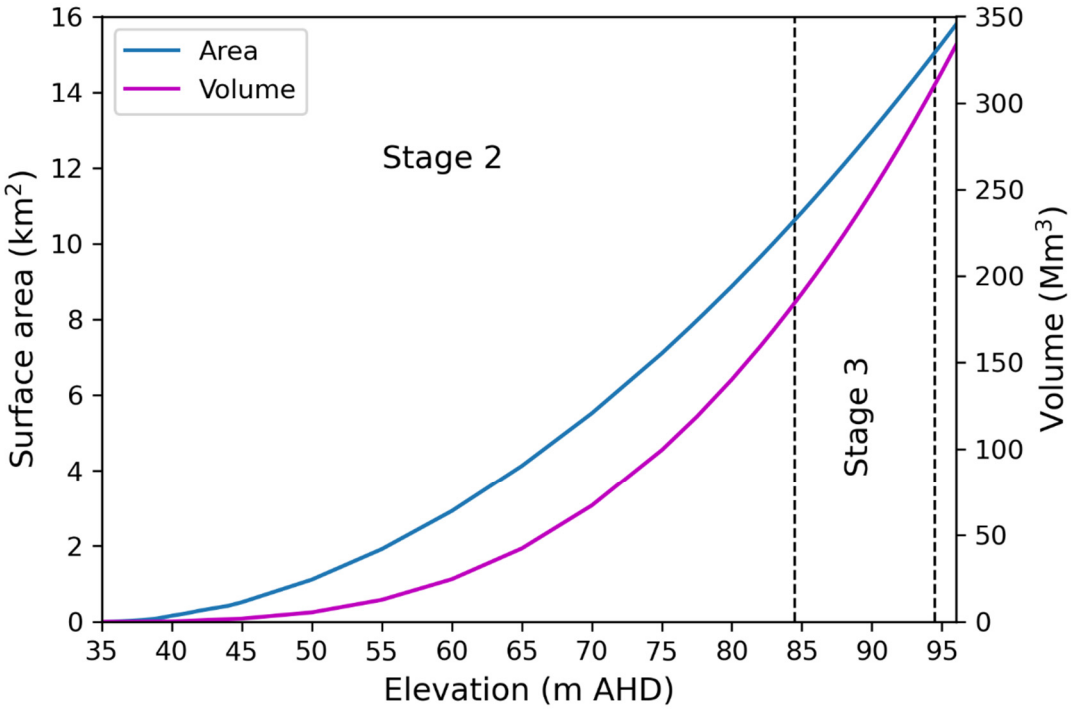

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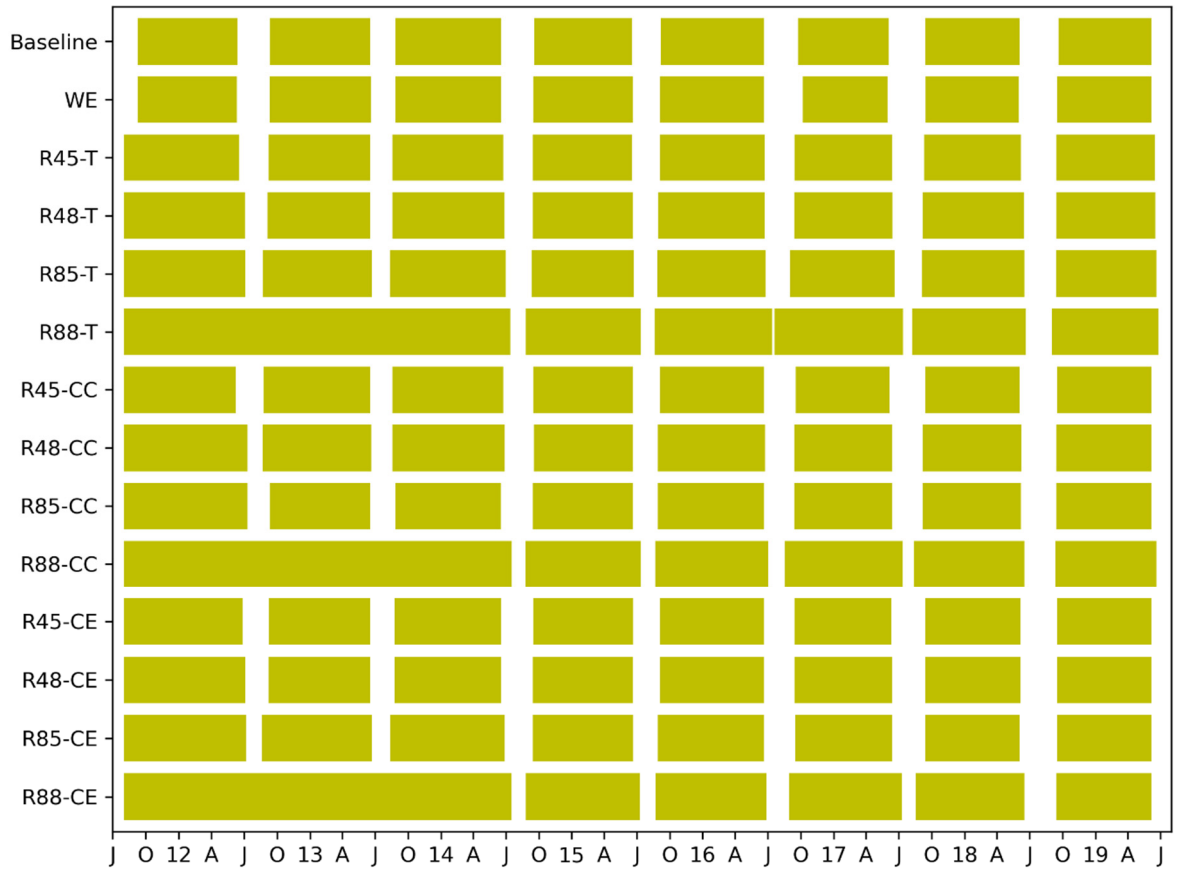
Climate change scenario	Lake scenario		
	T	CC	CE
R45: RCP4.5 + 2050s	R45-T	R45-CC	R45-CE
R48: RCP4.5 + 2080s	R48-T	R48-CC	R48-CE
R85: RCP8.5 + 2050s	R85-T	R85-CC	R85-CE
R88: RCP8.5 + 2080s	R88-T	R88-CC	R88-CE

Table S2 Projected changes in air temperature (T_a), rainfall (PCP), and streamflow (Q), loads of sediment (SS) and nutrient (TN: total nitrogen, TP: total phosphorus) from Upper Nerang River catchment under climate change conditions of RCP4.5 (R45 & R48) and RCP8.5 (R85 & R88) during two future periods of 2050s and 2080s simulated with the SWAT hydrological model (under review). The green to yellow colour bar refers to a change range of 0 – 5 ℃ in T_a while the pink to blue colour bar presents a relative change range from -70% to 70% in rainfall and catchment hydrological outputs under future climate change.

Variable	Scenario	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
T_a (℃)	R45	1.3	1.4	1.3	1.2	1.3	1.3	1.5	1.4	1.4	1.4	1.4	1.3	1.4
	R48	1.7	1.8	1.7	1.7	1.9	1.9	2.1	2.0	2.1	1.9	1.9	1.7	1.9
	R85	2.0	2.0	1.8	1.9	1.9	2.0	2.1	1.9	2.1	2.1	2.2	2.2	2.0
	R88	3.8	3.8	3.7	3.7	3.8	3.8	3.9	3.8	3.8	4.0	4.2	4.0	3.9
PCP (%)	R45	6.8	21.5	12.5	2.0	-13.6	-10.3	-10.0	-8.3	-6.7	6.2	7.3	2.7	5.3
	R48	10.3	-2.1	4.6	3.9	-5.3	-14.6	-3.9	-14.5	-11.7	-1.4	6.4	5.0	1.4
	R85	16.8	2.7	-6.1	6.7	-15.4	-1.7	-5.1	0.4	-5.7	-12.3	-10.7	0.2	0.7
	R88	11.6	1.4	4.2	5.8	-5.6	7.8	-11.7	-10.5	-9.0	-19.9	-6.6	-0.7	1.8
Q (%)	R45	0.3	30.1	24.6	25.7	1.4	-10.8	-13.3	-12.2	-12.4	-0.5	5.9	-2.9	11.7
	R48	4.6	-6.2	5.0	12.6	3.0	-19.5	-17.3	-21.9	-23.0	-15.7	-2.1	-3.2	-8.7
	R85	10.4	0.9	-12.7	3.6	-9.9	-5.2	-12.0	-9.1	-13.3	-31.8	-31.1	-19.9	-3.9
	R88	-0.7	-6.0	1.4	10.5	0.6	9.1	-9.6	-14.8	-16.8	-44.3	-31.5	-22.1	-3.9
SS (%)	R45	-24.7	11.5	6.2	22.9	-35.1	-33.6	-30.0	-49.6	-41.1	-17.9	-11.5	-15.0	-1.9
	R48	-20.3	-30.9	-13.1	9.6	-29.2	-45.2	-30.0	-58.1	-54.1	-34.6	-20.6	-15.5	-28.8
	R85	-9.1	-20.5	-32.6	-1.8	-39.5	-26.2	-23.0	-40.1	-38.6	-54.6	-54.7	-36.5	-19.3
	R88	-16.6	-27.9	-15.9	7.7	-30.0	-8.8	-24.0	-51.8	-46.8	-66.6	-55.7	-32.3	-19.3
TN (%)	R45	-6.2	13.6	-11.6	15.7	-26.6	-24.1	-38.6	-33.1	-38.1	-17.7	0.2	-8.2	-8.7
	R48	-0.1	-20.4	-25.6	6.3	-18.9	-30.7	-38.9	-42.0	-47.8	-30.7	-4.6	-5.9	-25.2
	R85	8.0	-14.4	-39.3	-0.5	-32.0	-16.0	-35.2	-18.7	-36.2	-44.4	-35.1	-20.9	-21.6
	R88	-3.2	-19.3	-28.4	5.6	-19.5	-0.6	-35.9	-35.5	-42.2	-54.5	-33.3	-23.1	-21.6
TP (%)	R45	-5.7	18.3	6.2	15.5	-28.6	-27.6	-38.8	-36.4	-41.9	-15.0	-1.9	-11.2	-2.7
	R48	0.5	-19.0	-9.3	6.4	-20.0	-33.7	-38.6	-45.0	-51.1	-28.7	-6.5	-8.8	-21.1
	R85	8.9	-12.7	-26.5	-0.7	-33.4	-19.6	-35.1	-22.5	-40.1	-42.3	-36.4	-23.3	-15.7
	R88	-2.3	-17.1	-12.5	5.7	-20.1	-4.2	-36.0	-38.8	-45.7	-52.7	-34.6	-25.5	-15.7
			0			5			-70				70	



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