

Table S1 Summary of the mean (\pm SD) physico-chemical properties for surface and bottom barrage pool water measured across the three microbialite sites used in this study (Seaview, Schoenmakerskop, Cape Recife) in Nelson Mandela Bay, South Africa measured bimonthly from July 2021 to May 2022.

Month	Location in Water Column	Temperature (°C)	Salinity	Dissolved Oxygen (mg.l ⁻¹)	pH	Microbialite Biofilm Total Chlorophyll (mg/m ²)
July	Surface	18.33 (\pm SD 1.62)	1.29 (\pm SD 0.36)	13.93 (\pm SD 2.13)	8.7	0.73 (\pm SD 0.31)
	Bottom	18.63 (\pm SD 0.50)	0.33 (\pm SD 0.11)	13.93 (\pm SD 2.13)	8.7	
September	Surface	20.37 (\pm SD 1.90)	1.28 (\pm SD 0.44)	15.93 (\pm SD 0.89)	8.5	0.45 (\pm SD 0.23)
	Bottom	20.67 (\pm SD 0.93)	0.13 (\pm SD 0.14)	15.93 (\pm SD 0.89)	8.6	
November	Surface	21.00 (\pm SD 2.29)	1.44 (\pm SD 0.36)	18.76 (\pm SD 7.94)	8.7	0.76 (\pm SD 0.43)
	Bottom	21.00 (\pm SD 1.06)	0.23 (\pm SD 0.09)	18.76 (\pm SD 7.94)	8.4	
January	Surface	22.23 (\pm SD 1.23)	1.10 (\pm SD 0.32)	13.37 (\pm SD 1.91)	8.3	0.43 (\pm SD 0.33)
	Bottom	21.47 (\pm SD 1.70)	0.33 (\pm SD 0.06)	13.37 (\pm SD 1.91)	8.2	
March	Surface	21.73 (\pm SD 1.44)	1.14 (\pm SD 0.36)	10.76 (\pm SD 2.86)	8.1	0.92 (\pm SD 0.53)
	Bottom	22.27 (\pm SD 1.86)	0.57 (\pm SD 0.15)	10.76 (\pm SD 2.86)	7.9	
May	Surface	18.20 (\pm SD 0.95)	1.15 (\pm SD 0.35)	11.82 (\pm SD 1.52)	8.7	0.42 (\pm SD 0.20)
	Bottom	18.07 (\pm SD 0.98)	0.61 (\pm SD 0.10)	11.82 (\pm SD 1.52)	8.7	

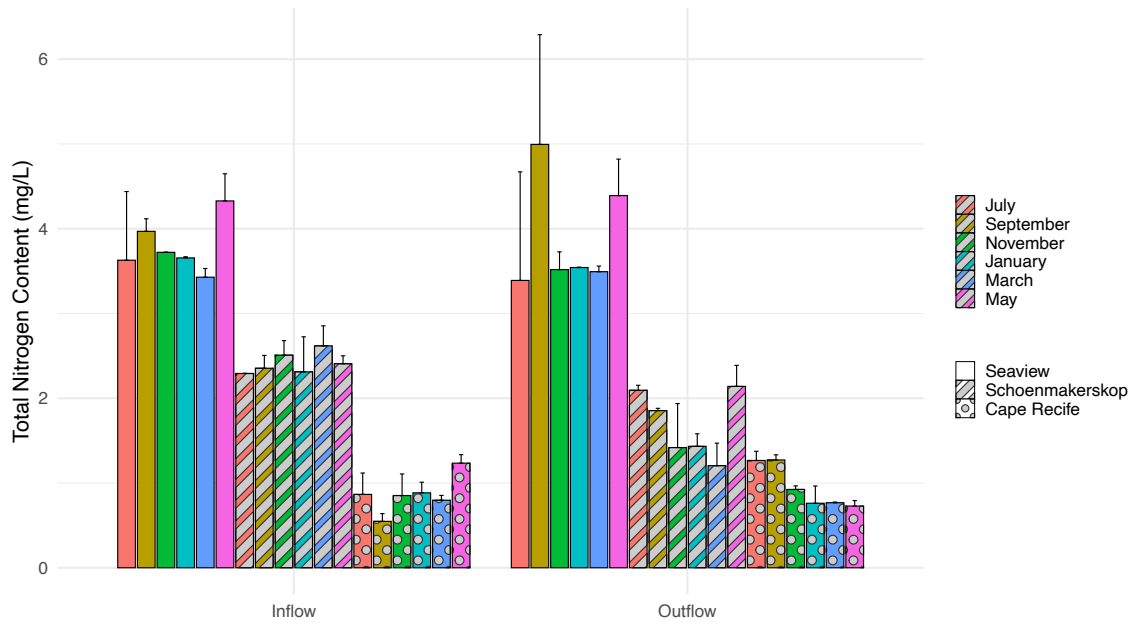


Figure S1 Bimonthly differences in seep water total nitrogen content at the three microbialite sites (Seaview, Schoenmakerskop, Cape Recife) in Nelson Mandela Bay, South Africa measured from July 2021 to May 2022.

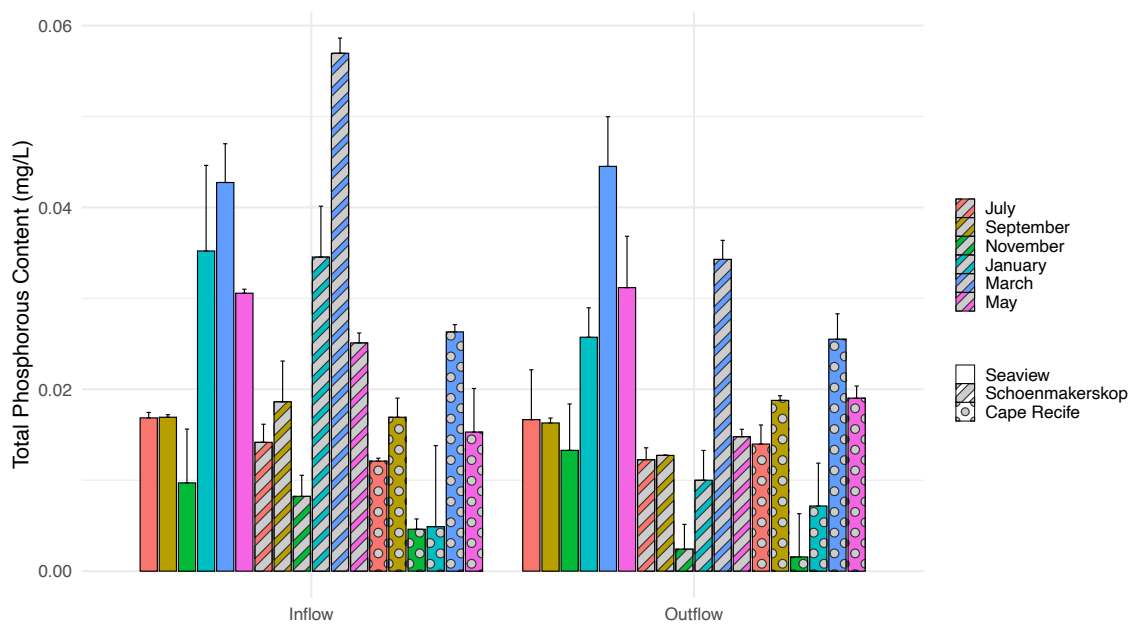




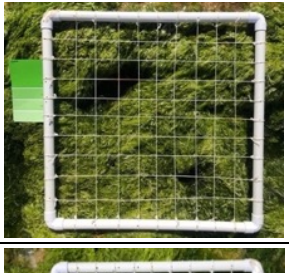






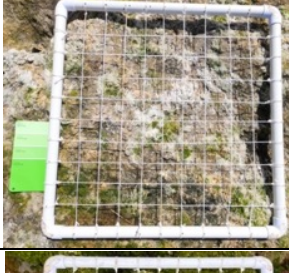








Figure S2 Bimonthly differences in seep water total phosphorous content at the three microbialite sites (Seaview, Schoenmakerskop, Cape Recife) in Nelson Mandela Bay, South Africa measured from July 2021 to May 2022.

Table S2 Relative bleaching observed visually across each of the three microbialite sites sampled from July 2021 to March 2022.

Month	Bleaching (\pmSD)
July 2021	23.8 \pm 3.3%
September 2021	7.6 \pm 8.9%
November 2021	6.9 \pm 7.8%
January 2022	79.7 \pm 10.7%
March 2022	16.2 \pm 9.8%
May 2022	3.1 \pm 2.0%

Table S3 Site photographs of relative bleaching conditions. Bleaching proportions in Table S2 were calculated from monochrome images of the below using ImageJ ©.

	Seaview	Schoenmakerskop	Cape Recife
JULY 2021 Mid-Winter			
SEPTEMBER 2021 Early-Spring			
NOVEMBER 2021 End-Spring			
JANUARY 2022 Mid-Summer			
MARCH 2022 Early-Autumn			
MAY 2022 Late-Autumn			

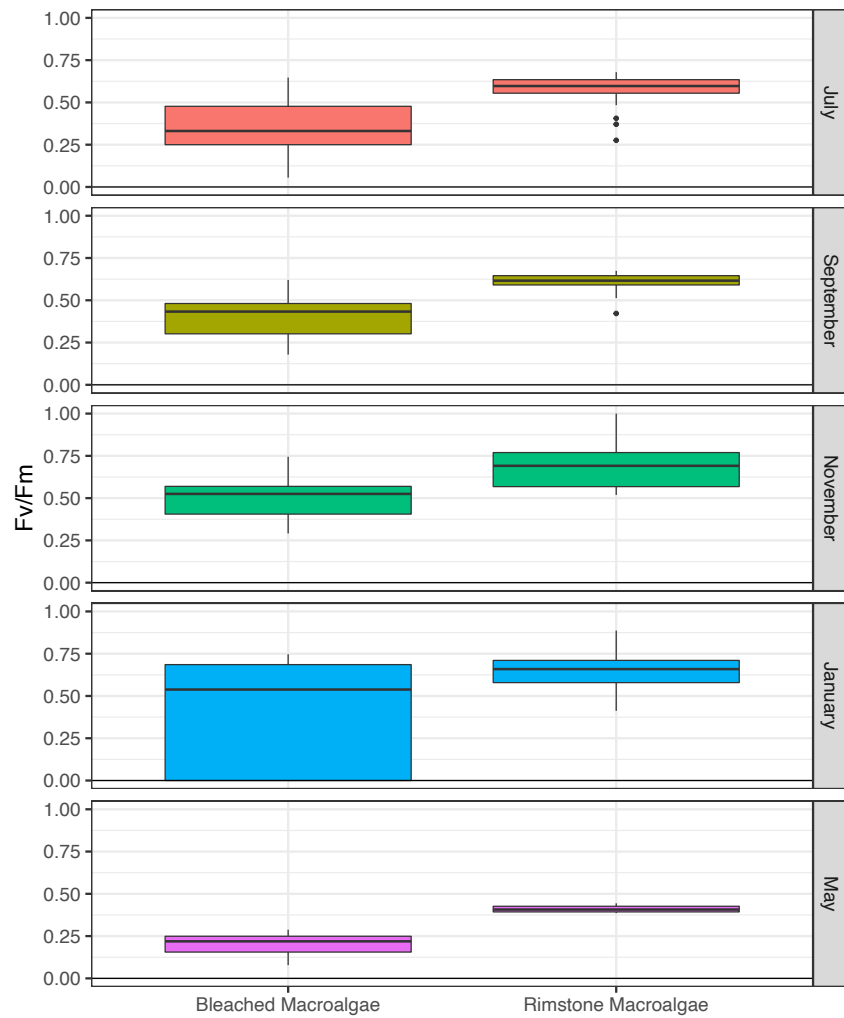


Figure S3 Photosynthetic efficiency (Fv/Fm) of bleached macroalgae and rimstone macroalgae measured at the three microbialite sites (Seaview, Schoenmakerskop, Cape Recife) in Nelson Mandela Bay, South Africa measured from July 2021 to May 2022.

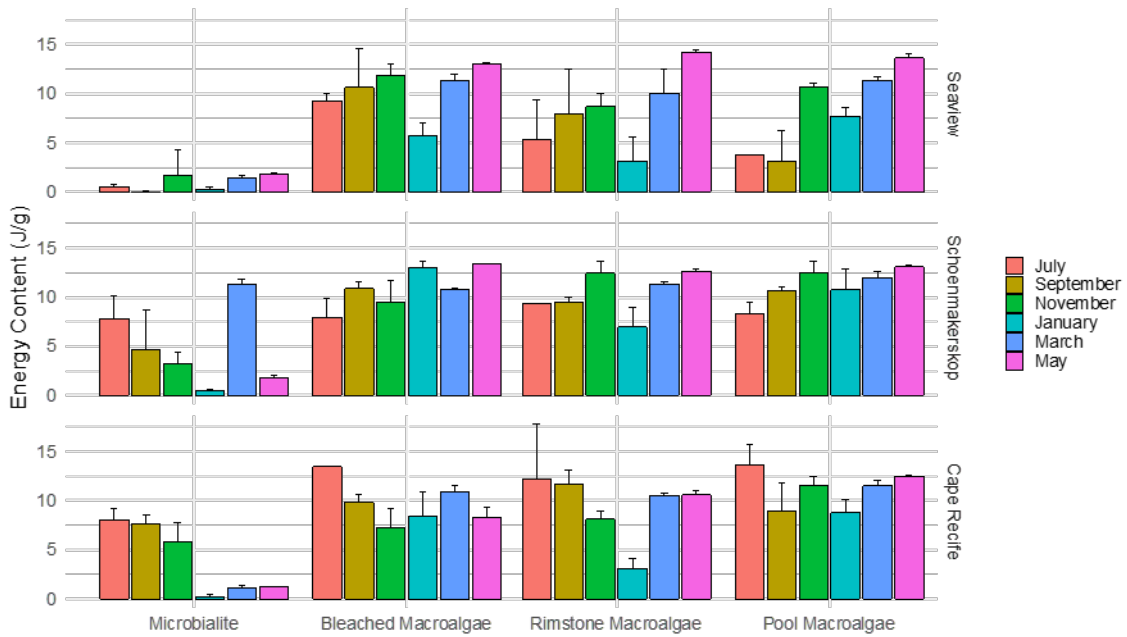


Figure S4 Energy content (calories) of the available food sources at the three microbialite sites (Seaview, Schoenmakerskop, Cape Recife) in Nelson Mandela Bay, South Africa measured from July 2021 to May 2022.

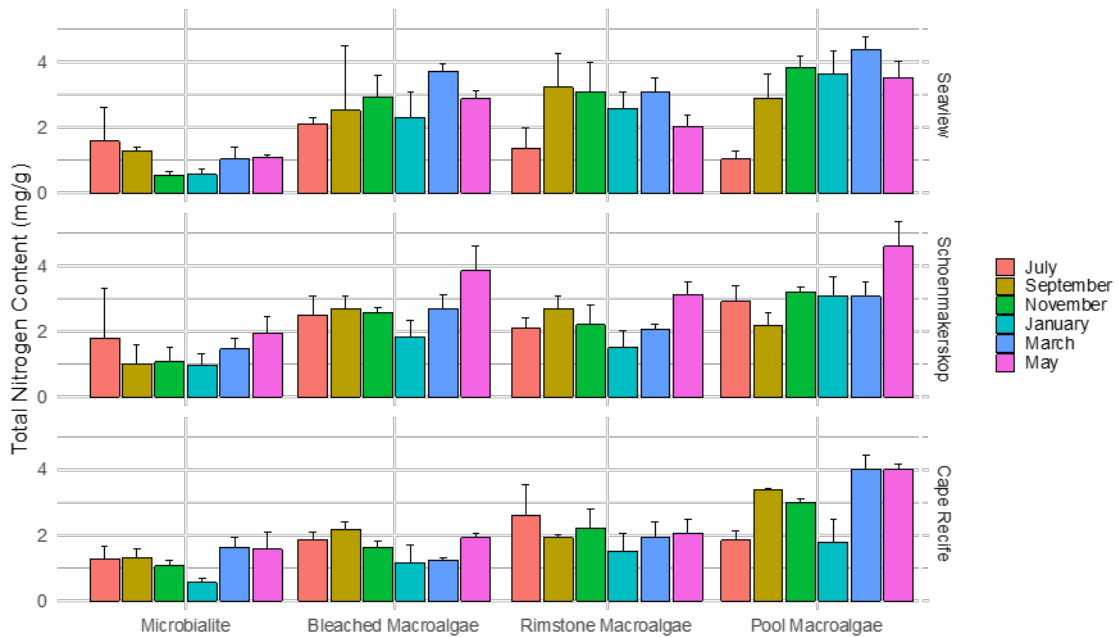


Figure S5 Bimonthly differences in total nitrogen tissue content at the three microbialite sites (Seaview, Schoenmakerskop, Cape Recife) in Nelson Mandela Bay, South Africa measured from July 2021 to May 2022.

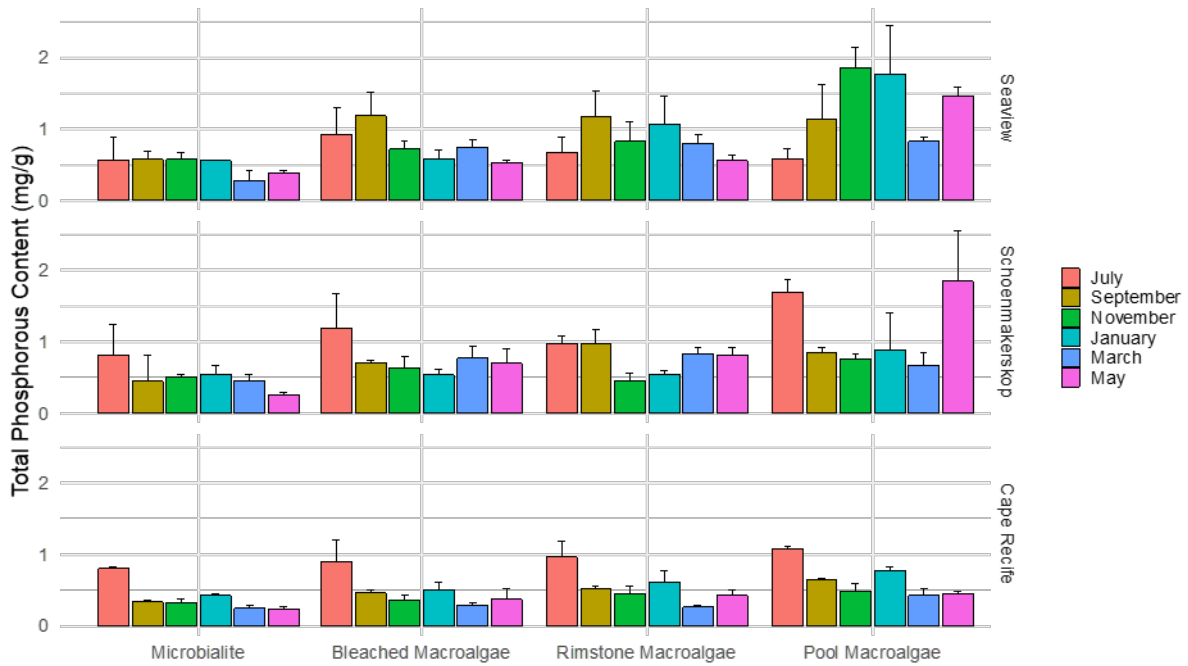


Figure S6 Bimonthly differences in total phosphorous tissue content at the three microbialite sites (Seaview, Schoenmakerskop, Cape Recife) in Nelson Mandela Bay, South Africa measured from July 2021 to May 2022

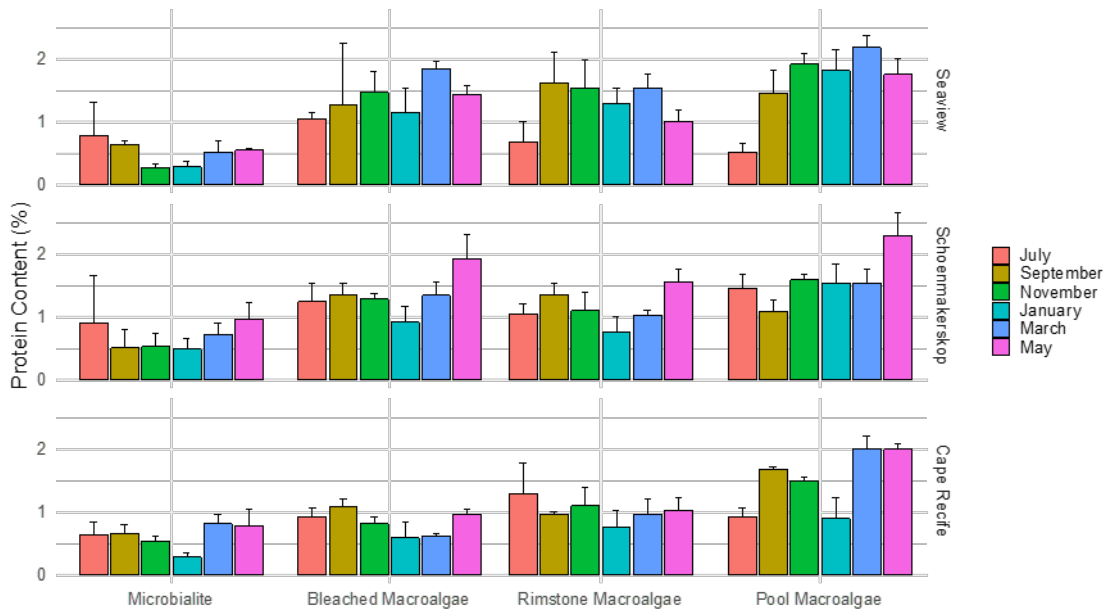


Figure S7 Protein content of the available food sources at the three microbialite sites (Seaview, Schoenmakerskop, Cape Recife) in Nelson Mandela Bay, South Africa measured from July 2021 to May 2022.

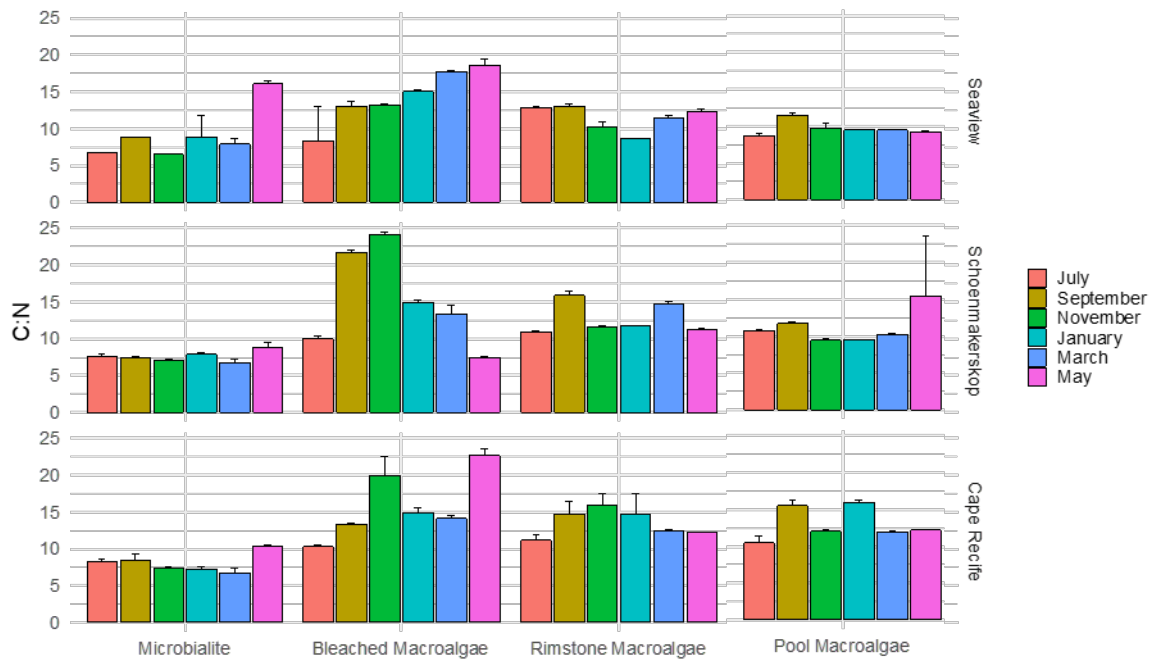


Figure S8 Carbon to Nitrogen ratios of the available food sources at the three microbialite sites (Seaview, Schoenmakerskop, and Cape Recife) in Nelson Mandela Bay, South Africa measured from July 2021 to May 2022.