Supplementary Information

Protected nearshore shallow and deep subtidal rocky reef communities differ in their trophic diversity but not their nutritional condition

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Table S1: Species and sample numbers collected from the shallow reef (11–25 m) and deep reef (45–75 m) in the Tsitsikamma National Park marine protected area (MPA); superscripts 1–8 represent feeding guilds, as defined below. Values represent numbers of successfully extracted fatty acid and stable isotope samples, not necessarily the original sample size; dashes (–) indicate no data

	Phylum	Common name	Scientific name	Sample date	Fatty acids		Stable isotopes	
					Shallow	Deep	Shallow	Deep
Algae	Rhodophyta	Upright coralline algae		Feb 2012	3	–	3	–
Plankton		Plankton (>65 μm)		Nov 2011	16	17	9	9
				Feb 2012	13	10	9	6
Macro-benthos	Annelida	Polychaetes[6]		Feb 2012	2	3	2	2
	Arthropoda	Amphipods[5]		Feb 2012	1	4	3	3
		Cape long-legged spider crab[6]	*Macropodia falcifera*	Feb 2012	–	2	–	2
		Cape rock crab[6]	*Plagusia chabrus*	Feb 2012	1	–	1	–
		Isopods[5]		Feb 2012	2	4	3	5
	Chordata	Elephants ear[8]	*Gynandrocarpa placenta*	Feb 2012	4	3	4	3
	Cnidaria	Nippled sea fan[8]	*Eunicella papillosa*	Feb 2012	1	1	1	–
		Noble coral[8]	*Stylaster nobilis*	Feb 2012	–	1	–	–
		Palmate sea fan[8]	*Leptogorgia palma*	Feb 2012	1	–	–	–
		Planar hydroid[8]	*Sertularella arbuscula*	Feb 2012	2	1	3	1
		Sinuous sea fan[8]	*Eunicella tricoronata*	Feb 2012	1	–	–	–
		Warty sea fan[8]	*Homophyton verrucosum*	Feb 2012	–	3	–	1
	Echinodermata	Basket star	*Astrocladus euryale*	Feb 2012	3	4	–	–
		Brittle stars		Feb 2012	3	3	–	–
		Cape urchin[7]	*Parechinus angulosus*	Feb 2012	3	–	3	–
		Reticulated starfish	*Henricia ornata*	Feb 2012	2	–	–	–
		Starfish		Feb 2012	–	1	–	–
	Mollusca	Annulated plough shell[6]	*Bullia annulata*	Feb 2012	–	3	–	3
		Purple-lipped dog welk[6]	*Nassarius speciosus*	Feb 2012	–	3	–	3
		Pustular triton[6]	*Argobuccinum pustulosum*	Feb 2012	3	–	3	–
		Sea hare[7]	*Aplysia parvula*	Feb 2012	3	–	3	–
	Porifera	Orange disc-like sponge[8]		Feb 2012	–	–	–	1
		Orange finger sponge[8]		Feb 2012	–	1	–	2
		Orange fungus sponge[8]		Feb 2012	–	1	–	1
		Orange wall sponge[8]	*Spirastrella spinispirulifera*	Feb 2012	2	–	3	–
		Red encrusting sponge[8]	*Clathria odekraalensis*	Feb 2012	–	–	2	–
		Spirit of Tsitsikamma[8]		Feb 2012	–	–	–	1
		Sponge-covered hydroid[8]		Feb 2012	–	3	–	3

Fish	Chordata	Cape knifejaw[1]	*Oplegnathus conwayi*	Feb 2012	2	–	3	–
		Carpenter[2]	*Argyrozona argyrozona*	Feb 2012	2	3	2	3
		Hottentot[2]*	*Pachymetopon blochii*	Feb 2012	–	3	–	3
		Janbruin[1]	*Gymnocrotaphus curvidens*	Feb 2012	3	–	3	–
		Klipfish[3]	Unknown klipfish	Feb 2012	3	–	3	–
		Panga[2]	*Pterogymnus laniarius*	Feb 2012	1	3	1	3
		Red Roman[2]	*Chrysoblephus laticeps*	Feb 2012	3	3	3	3
		Strepie[4]	*Sarpa salpa*	Feb 2012	3	–	3	–
		Twotone fingerfin[3]	*Chirodactylus brachydactylus*	Feb 2012	3	–	3	–

Feeding guilds of fish: [1]benthic omnivore; [2]general carnivore; [3]micro-invertebrate carnivore; [4]herbivore
Feeding guilds of macrobenthos: [5]detritivore; [6]scavenger/predator; [7]grazer; [8]suspension-feeder

Note: Species not allocated to a feeding guild were not considered in the community-based analyses, either because no isotope data were obtained or data concerning diet were not available.

*Pulfrich and Griffiths (1988) listed hottentot *Pachymetopon blochii* from the cold-temperate region of South Africa as a benthic omnivore. Hottentot in the Tsitsikamma National Park MPA (a warm-temperate region of South Africa) was observed only in the deep region (Heyns-Veale et al. 2016) where no algae grow, so we designated this species as a general carnivore.

References

Heyns-Veale ER, Bernard ATF, Parker D, Richoux NB, Langlois TJ, Harvey ES, Gotz A. 2016. Depth and habitat determine assemblage structure of South Africa's warm-temperate reef fish. *Marine Biology* 163: Art. ID 158.

Pulfrich A, Griffiths C. 1988. Feeding biology of the hottentot, *Pachymetopon blochii* (Val.), with an estimate of daily ration. *South African Journal of Zoology* 23: 196–207.

Table S2: Permutational ANOVA results for the effects of Reef (deep vs shallow) and Date on the fatty acid characteristics of plankton (Nov 2011: $n_{shallow}$ = 16, n_{deep} = 17; Feb 2012: $n_{shallow}$ = 13, n_{deep} = 10), and Reef on the fatty acid characteristics of macrobenthos ($n_{shallow}$ = 32, n_{deep} = 41) and fish ($n_{shallow}$ = 20, n_{deep} = 12). Pairwise analyses of plankton are between the shallow and deep reefs for each of the two sampling dates. Values in bold font represent a significant effect. TFA = total fatty acids; ΣEFA = sum of essential fatty acids; terrestrial = Σ[18:2n-6,18:3n-3]; ΣBAFA = sum of bacterial fatty acids; df = degrees of freedom; MS = mean square; Pseudo-*F* = *F*-ratio; *p*(perm) = probability level based on permutations; *t* = *t*-statistic

			PERMANOVA				Pairwise (reef comparisons)		
		Source	df	MS	Pseudo-*F*	*p*(perm)	Date	*t*	*p*(perm)
Plankton	TFA	Reef	1	86.702	5.440	**0.027**	Nov 2011	3.992	**0.001**
		Date	1	581.26	36.468	**<0.001**	Feb 2012	0.591	0.650
		Reef × Date	1	156.49	9.818	**0.003**			
	ΣEFA	Reef	1	28.331	10.352	**0.002**	Nov 2011	4.769	**<0.001**
		Date	1	188.0	68.696	**<0.001**	Feb 2012	0.924	0.413
		Reef × Date	1	45.304	16.555	**<0.001**			
	20:4n-6	Reef	1	0.002	0.730	0.398			
		Date	1	0.026	9.377	**0.003**	Feb 2012	1.545	0.123
		Reef × Date	1	0.005	1.830	0.183			
	20:5n-3	Reef	1	2.808	8.168	**0.006**	Nov 2011	5.175	**<0.001**
		Date	1	13.538	39.385	**<0.001**	Feb 2012	0.864	0.468
		Reef × Date	1	5.727	16.661	**<0.001**			
	22:6n-3	Reef	1	13.633	11.415	**0.001**	Nov 2011	4.539	**0.001**
		Date	1	97.412	81.566	**<0.001**	Feb 2012	0.908	0.408
		Reef × Date	1	18.2	15.239	**<0.001**			
	Terrestrial	Reef	1	0.02	3.264	0.079			
		Date	1	0.092	15.283	**<0.001**	Feb 2012	0.829	0.94
		Reef × Date	1	0.011	1.836	0.186			
	ΣBAFA	Reef	1	0.084	3.169	0.079			
		Date	1	0.305	11.484	**<0.001**	Feb 2012	0.120	0.933
		Reef × Date	1	0.064	2.416	0.132			
Macrobenthos	TFA	Reef	1	74.701	0.716	0.403			
	ΣEFA	Reef	1	29.745	2.115	0.154			
	20:4n-6	Reef	1	0.238	0.286	0.631			
	20:5n-3	Reef	1	4.445	0.954	0.339			
	22:6n-3	Reef	1	8.165	5.034	**0.028**			
	Terrestrial	Reef	1	0.007	0.178	0.685			
	ΣBAFA	Reef	1	0.460	0.699	0.418			
Fish	ΣTFA	Reef	1	47.024	0.782	0.395			
	ΣEFA	Reef	1	8.034	1.166	0.316			
	20:4n-6	Reef	1	0.117	0.745	0.397			
	20:5n-3	Reef	1	0.779	1.353	0.272			
	22:6n-3	Reef	1	2.592	1.018	0.391			
	Terrestrial	Reef	1	0.056	2.721	0.100			
	ΣBAFA	Reef	1	0.024	0.272	0.613			

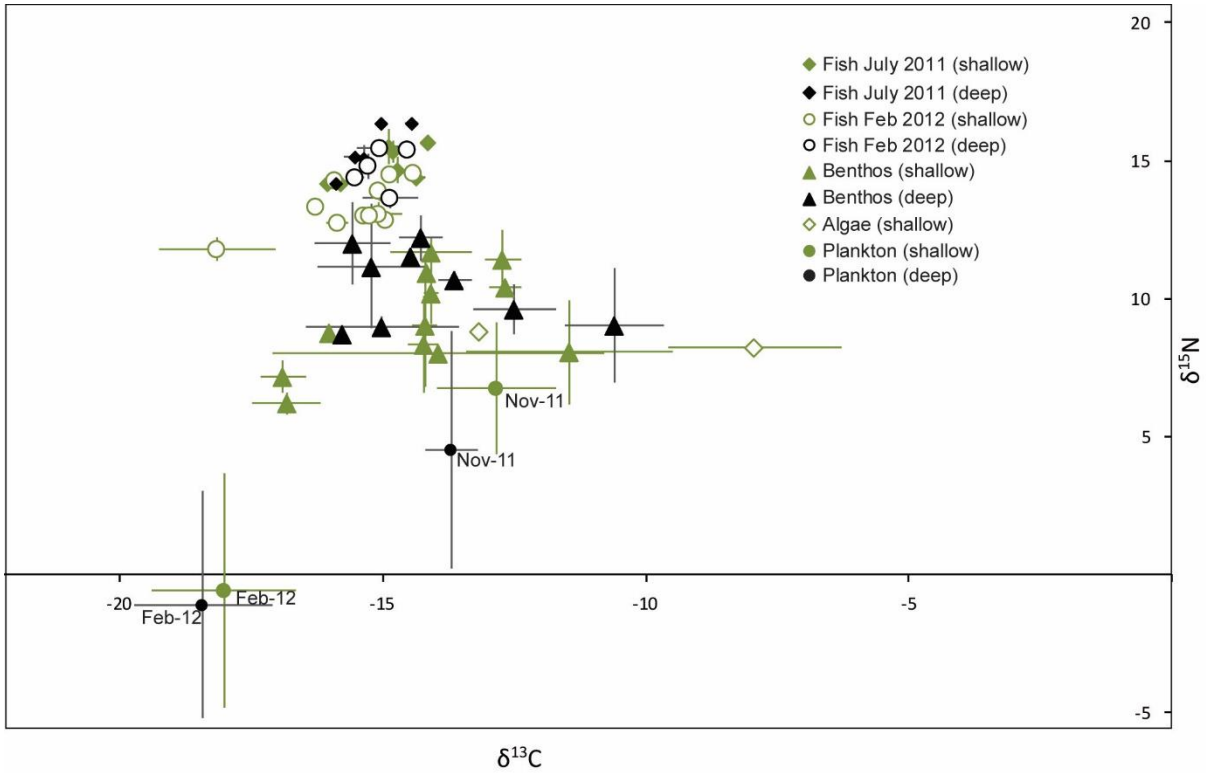

Figure S1: Stable-isotope biplot showing the $\delta^{13}C$ and $\delta^{15}N$ values (‰) for the shallow-reef (green) and deep-reef (black) sources and consumers. Dates indicate different sampling seasons; error bars represent standard deviation