

Supplementary material

[Article - Establishing historical benthic cover levels for coral reefs of the WIO](#)

Table S1. Baseline (pre-disturbance) hard coral cover levels (%) for 10 countries/territories (top) and 11 eco-regions (bottom) in the Western Indian Ocean (WIO). Intervals include standard deviation (sd), coefficient of variation (CV), inter-quartile range (IQR), minimum and maximum values, and bootstrap resampling 95% confidence intervals for the mean (lower CI, upper CI). n represents the number of data points. Countries/territories and eco-regions arranged from North (top) to South (bottom). WIO is the overall regional mean with intervals.

Country/ Territory	n	mean	sd	IQR	min	max	CV	Lower CI	Upper CI
Kenya	26	31.1	9.4	11	15	50	0.3	27.6	34.7
Seychelles	14	34.3	13.3	17.2	14.8	64	0.39	27.9	41.2
Tanzania	46	44.6	15.8	22.6	20	80	0.35	40.1	49.3
Mozambique	13	48.8	26.6	30.7	7.8	90.6	0.55	35	62.8
Comoros	4	62.1	16.6	9.4	52.6	87	0.27	53.2	78.8
Mayotte	4	80.9	18.2	26.1	59.3	97.2	0.22	65.8	95.9
Madagascar	5	55.6	8	5.8	47.1	68.3	0.14	50.1	62.5
Mauritius	32	47.7	21.3	35.4	20.5	88	0.45	40.5	54.8
Reunion	14	47.5	10.1	15.9	31	60	0.21	42.1	52.4
South Africa	4	26.9	13.9	9.2	16.8	47.4	0.52	18.3	40.7
Ecoregion	n	mean	sd	IQR	min	max	CV	Lower CI	Upper CI
Northern Tanzania-Kenya	44	37.5	14.8	21.7	15	78.2	0.39	33.3	41.9
Northern Mozambique-Southern Tanzania	32	44.2	15.9	22.7	20	80	0.36	38.8	49.8
Comoros	8	71.5	19	34.2	52.6	97.2	0.27	59.7	84.1
Madagascar North	1	50.9	NA	0	50.9	50.9	NA	NA	NA
Seychelles Outer	4	44.5	15.2	17	29	64	0.34	33	57.2
Seychelles North	10	30.2	10.6	13.3	14.8	46.4	0.35	24	36.5
Mascarene Islands	46	47.6	18.5	26.2	20.5	88	0.39	42.3	52.9
Madagascar East	1	47.1	NA	0	47.1	47.1	NA	NA	NA
Madagascar West	3	59.9	7.3	6.8	54.8	68.3	0.12	54.8	68.3
Delagoa	13	41.4	27.5	39.3	7.8	90.6	0.66	27.5	56.3
WIO	162	44	18.9	25.1	7.8	97.2	0.43	41.1	46.9

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Table S2. Baseline (pre-disturbance) fleshy algae cover levels (%) with comparative (same sites) hard coral cover levels (%) and algae-coral-ratios for 9 countries/territories (top) and 11 eco-regions (bottom) in the Western Indian Ocean. Intervals include standard deviation (sd) and inter-quartile range (IQR) plus bootstrap resampling 95% confidence intervals. n represents the number of data points. Countries/territories and eco-regions arranged from North (top) to South (bottom).

Country	n	Hard Coral			Fleshy Algae				Algae-Coral Ratio			
		mean	sd	IQR	mean	sd	IQR	95% CI	mean	IQR	Lower CI	Upper CI
Kenya	23	33.1	9.1	12.0	27.3	15.8	25.6	20.9-33.5	0.413	0.23	0.331	0.489
Seychelles	4	43.5	15.9	20.0	13.8	4.9	5.8	10.0-17.8	0.251	0.06	0.166	0.303
Tanzania	10	44.2	18.0	19.8	18.7	19.5	25.1	8.1-31.0	0.266	0.36	0.141	0.400
Mozambique	11	49.7	28.2	38.5	35.4	26.6	41.1	20.6-50.8	0.419	0.45	0.251	0.599
Comoros	3	53.9	1.2	1.2	27.2	5.9	5.6	20.7-32.0	0.333	0.04	0.282	0.368
Mayotte	4	80.9	18.2	26.1	8.4	9.5	8.0	2.4-17.4	0.101	0.11	0.024	0.211
Madagascar	5	55.6	8.0	5.8	14.0	15.9	10.4	3.8-28.1	0.169	0.13	0.060	0.308
Mauritius	32	47.7	21.3	35.4	32.2	17.3	26.4	26.4-38.2	0.405	0.27	0.340	0.473
Reunion	10	49.2	9.7	13.7	23.2	12.9	16.0	16.1-31.2	0.303	0.11	0.239	0.374
Ecoregion	n	mean	sd	IQR	mean	sd	IQR	95% CI	mean	IQR	Lower CI	Upper CI
Northern Tanzania-Kenya	32	35.1	10.8	13.8	25.5	16.9	30.7	19.7-31.1	0.380	0.38	0.307	0.450
Northern Mozambique-Southern Tanzania	5	56.7	21.6	36.0	23.2	21.0	17.7	8.6-40.5	0.289	0.28	0.108	0.483
Comoros	7	69.3	19.3	29.0	16.5	12.6	21.1	7.9-24.9	0.200	0.26	0.096	0.299
Madagascar North	1	50.9	NA	0.0	4.0	NA	0.0	NA	0.073	0.00	NA	NA
Seychelles Outer	3	47.0	17.5	17.5	13.3	5.9	5.5	9.0-20.0	0.231	0.09	0.123	0.294
Seychelles North	1	33.0	NA	0.0	15.0	NA	0.0	NA	0.312	0.00	NA	NA
Mascarene Islands	42	48.0	19.1	26.2	30.1	16.7	27.8	25.1-35.1	0.380	0.26	0.328	0.437
Madagascar East	1	47.1	NA	0.0	0.5	NA	0.0	NA	0.011	0.00	NA	NA
Madagascar West	3	59.9	7.3	6.8	21.8	16.5	15.2	10.2-40.7	0.253	0.15	0.130	0.426
Delagoa	7	49.0	33.5	52.7	39.2	30.7	49.5	18.4-60.2	0.454	0.57	0.209	0.707

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Table S3. List of all publications where benthic cover data was extracted from (arranged in alphabetical order on first author).

Citation
1 Ahamada, S., Bigot, L., Bijoux, J., Maharavo, J., Meunier, S., Moyné-Picard, M., & Paupiah, N. (2002). Status of coral reefs in the south west Indian Ocean island node: Comoros, Madagascar, Mauritius, Reunion and Seychelles. Status of the coral reefs of the world. Australian Institute of Marine Science, Townsville, 79-100.
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Table S4. Change in hard coral cover (%) during 1998 bleaching.

data.source	Country/Territory	Ecoregion	Sector	Location	Site	Zone	Depth (m)	new_c cover	old_c cover	pct_ change	Additional info
Quod & Bigot 2000	Comoros	Com	Mohéli island		Itsamia	Inner	1	36	54	-33.3	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Comoros	Com	Mitsamiouli		North-West Mitsamiouli Reef	Inner	1	40	55	-27.3	this was calculated using 1999 values of RDC
Graham et al. (2008)	Kenya	Ntanz_Ken	NA		Fished Areas	NA	NA	20	18.9	5.8	
McClanahan et al. 2007	Kenya	Ntanz_Ken	NA		Kanamai	NA	NA	21.5	22	-2.3	
Graham et al. (2008)	Kenya	Ntanz_Ken	NA		Protected Areas	NA	NA	26.8	34.8	-23	
Obura 2002	Kenya	Ntanz_Ken	NA		Southern Kenya (unprotected)	NA	NA	11.4	20.6	-44.7	
McClanahan et al. 2007	Kenya	Ntanz_Ken	NA		Kisite	NA	NA	10	22.2	-55	
McClanahan et al. 2007	Kenya	Ntanz_Ken	NA		Mombasa	NA	NA	18.8	42	-55.2	
CORDIO Status report 1999	Kenya	Ntanz_Ken	Kilifi		Malindi Marine National Park	NA	NA	14.7	35.7	-58.8	
McClanahan et al. 2007	Kenya	Ntanz_Ken	NA		Vipingo	NA	NA	7.9	19.8	-60.1	
McClanahan et al. 2007	Kenya	Ntanz_Ken	NA		Diani	NA	NA	8.34	21.21	-60.7	
Obura 2002	Kenya	Ntanz_Ken	Lamu		Northern Kenya (<3m)	NA	NA	5.1	13.2	-61.4	
McClanahan et al. 2007	Kenya	Ntanz_Ken	NA		Ras Iwatine	NA	NA	5.3	17.8	-70.2	
				Malindi/Watamu/Mombasa		Shallow fringing reef					
McClanahan et al. 2001	Kenya	Ntanz_Ken	a/Kisite MNPs		Unspecified 9 sites (protected)	back reef lagoon	NA	11.4	39.6	-71.2	
McClanahan et al. 2007	Kenya	Ntanz_Ken	NA		Malindi	NA	NA	11.1	44.2	-74.9	
McClanahan et al. 2007	Kenya	Ntanz_Ken	NA		Watamu	NA	NA	9	37.7	-76.1	
Quod & Bigot 2000	Madagascar	MadS	south-western region of Toliara		Ifaty	Barrier outer slope	8	40.7	54.8	-25.7	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Madagascar	MadS	south-western region of Toliara		Nosy Ve	Inner	NA	42.3	68.3	-38.1	
Quod & Bigot 2000	Mayotte	Com	NA		Longogori	Outer - Deeper Reefs	6	21.6	54.4	-60.3	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Mayotte	Com	NA		Surprise	Outer - Deeper Reefs	6	28	97.2	-71.2	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Mayotte	Com	NA		Geyser bank	Outer	6	63.1	72.4	-12.8	
Quod & Bigot 2000	Mayotte	Com	NA		Geyser bank	Inner	6	34.3	59.3	-42.2	
Quod & Bigot 2000	Mayotte	Com	NA		Longogori	Inner - Reef Flat	0.5	6.2	18.4	-66.3	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Mayotte	Com	NA		Surprise	Inner - Reef Flat	0.5	4.6	94.6	-95.1	this was calculated using 1999 values of RDC
Motta_et_al._2002	Mozambique	Dela	Inhambane	Barra	Anchor's_Bay	NA	NA	9.8	10.8	-9.3	
Motta_et_al._2002	Mozambique	Dela	Maputo	Inhaca_Island	Baixo_Danae	NA	NA	30.8	31.1	-1	
Motta_et_al._2002	Mozambique	Dela	Maputo	Inhaca_Island	Barreira_Vermelha	NA	NA	41.9	61.8	-32.2	
Motta_et_al._2002	Mozambique	NMoz_Stanz	Nampula_Province	Mozambique_Island	Goa_Island	NA	NA	28.4	42.1	-32.5	
Motta_et_al._2002	Mozambique	Dela	Inhambane	Bazaruto_Archipelago	Lighthouse_Reef	NA	NA	69.5	90.6	-23.3	
Motta_et_al._2002	Mozambique	Dela	Inhambane	Barra	Mike's_Cub_Board	NA	NA	7.4	7.8	-5.1	
Motta_et_al._2002	Mozambique	NMoz_Stanz	Pemba_Bay	Pemba	Ponta_Maunhane	NA	NA	68.2	78.1	-12.7	
Motta_et_al._2002	Mozambique	Dela	Maputo	Inhaca_Island	Ponta_Torres	NA	NA	36.1	55.1	-34.5	
Motta_et_al._2002	Mozambique	NMoz_Stanz	Quirimbas_Archipelago	Sencar	Sencar_Channel	NA	NA	13.6	31.8	-57.2	
Motta_et_al._2002	Mozambique	NMoz_Stanz	Nampula_Province	Mozambique_Island	Sete_Paus_Island	NA	NA	27.2	51.7	-47.4	
Motta_et_al._2002	Mozambique	Dela	Inhambane	Bazaruto_Archipelago	Two-mile_Reef	NA	NA	60.1	85.6	-29.8	
Quod & Bigot 2000	Reunion	Masc	Saint Leu		Corne Nord	Outer	8	60	63.6	-5.7	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Reunion	Masc	Saint Leu		Corne Nord	Inner	1	50	53.5	-6.5	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Reunion	Masc	La Saline		Planch'Alizé	Outer	12	40	41.5	-3.6	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Reunion	Masc	La Saline		Planch'Alizé	Inner	1	40	53.2	-24.8	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Reunion	Masc	La Saline		Trois Chameaux - I	Inner	1	30	32.5	-7.7	this was calculated using 1999 values of RDC
Quod & Bigot 2000	Reunion	Masc	La Saline		Trois Chameaux - O	Outer	12	50	50.4	-0.8	this was calculated using 1999 values of RDC
Graham et al. (2008)	Seychelles	SeyN	NA		Patch protected	NA	NA	26.8	46.4	-42.2	
Graham et al. (2008)	Seychelles	SeyN	NA		Granite reefs	NA	NA	8.2	14.8	-44.6	
Graham et al. (2008)	Seychelles	SeyN	NA		Patch reefs	NA	NA	10.9	20	-45.5	
Spalding & Jarvis 2002	Seychelles	SeyS	Southern Sychelles		South St Pierre	NA	NA	10	29	-65.5	
Graham et al. (2008)	Seychelles	SeyN	NA		Carbonate reefs	NA	NA	5.6	34.6	-83.8	
Spalding & Jarvis 2002	Seychelles	SeyS	Southern Sychelles		West Alphonse	NA	NA	7	48	-85.4	
Spalding & Jarvis 2002	Seychelles	SeyS	Southern Sychelles		North St Pierre	NA	NA	3	64	-95.3	
Spalding & Jarvis 2002	Seychelles	SeyN	Granitic Seychelles		West Cousine	Fringing structure	NA	0	33	-100	
McClanahan et al. 2007	Tanzania	NMoz_Stanz	Songo songo		Amana	NA	NA	30	35	-14.3	
Muhando 1999	Tanzania	Ntanz_Ken	Zanzibar	West coast	Bawe	NA	NA	45	53.1	-15.3	
Muhando 1999	Tanzania	Ntanz_Ken	Zanzibar	West coast	Changuu	NA	NA	33	50.1	-34.1	
McClanahan et al. 2007	Tanzania	Ntanz_Ken	Tanga		Chanjale	NA	NA	30	45	-33.3	
Muhando 1999	Tanzania	Ntanz_Ken	Zanzibar	West coast	Chapwani	NA	NA	25	44.3	-43.6	
Muhando 1999	Tanzania	Ntanz_Ken	Zanzibar	Southwest coast	Chumbe	NA	NA	42	51.9	-19.1	
McClanahan et al. 2007	Tanzania	NMoz_Stanz	Songo songo		Jewe	NA	NA	30	30	0	
McClanahan et al. 2007	Tanzania	Ntanz_Ken	Tanga		Kitanga	NA	NA	45	50	-10	
Muhando 1999	Tanzania	Ntanz_Ken	Zanzibar	Southwest coast	Kwale	NA	NA	15	29.7	-49.5	
McClanahan et al. 2007	Tanzania	Ntanz_Ken	Pemba		Misali 1	NA	NA	17	74	-77	
McClanahan et al. 2007	Tanzania	Ntanz_Ken	Pemba		Misali 2	NA	NA	7	57	-87.7	
McClanahan et al. 2007	Tanzania	Ntanz_Ken	Pemba		Misali 3	NA	NA	5	30	-83.3	
Graham et al. (2008)	Tanzania	Ntanz_Ken	Dar			NA	NA	70	42.6	64.3	
Graham et al. (2008)	Tanzania	Ntanz_Ken	Tanga			NA	NA	27.8	23.9	16.3	
Graham et al. (2008)	Tanzania	Ntanz_Ken	Mafia island protected			NA	NA	0.1	33	-99.7	
McClanahan et al. 2007	Tanzania	Ntanz_Ken	Tanga		Taa	NA	NA	16	67	-76.1	
McClanahan et al. 2007	Tanzania	Ntanz_Ken	Tanga		Upangu	NA	NA	42	50	-16	

Column header	Description
data.source	publication source of data (short form of citation)
Country/Territory	a defined region identified as a distinct entity in political geography
Ecoregion	eco-regions defined in Obura et al. 2021
Sector	approx area or region in the country
Location	intermediary geographic-scale where applicable
Site	monitoring site where the data was aggregated and reported - finest geographic resolution data was reported at
Zone	reef zone where surveys were conducted e.g. lagoon, fore reef
Depth	depth of surveys in meters
new_cover	hard coral cover post 1998 bleaching
old_cover	hard coral cover before 1998 bleaching
pct_change	absolute percent change in hard coral cover due to 1998 bleaching
Additional info	additional information on how new and old cover were calculated

Supplementary material

[Article - Establishing historical benthic cover levels for coral reefs of the WIO](#)

Figure S1. Types of publication from which the data was extracted (n=58).

