Supplementary Information for

Social-environmental drivers inform strategic management of coral reefs in the Anthropocene

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Supplementary Acknowledgements

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Supplementary Methods

Description of covariates To evaluate the relative influence of climate, social and environmental drivers on coral communities, we identified a suite of covariates at reef, site and country scales (Table S3). Descriptions, data sources and rationale are provided below for each covariate.

Local population growth. We created a 100 km buffer around each site and estimated local human population sizes in 2000 and 2010 using a global gridded population database from the NASA Socioeconomic Data and Applications Center (SEDAC) at http://sedac.ciesin.columbia.edu/data/collection/groads/maps/gallery/search, and queried from the Marine Socio-Environmental Covariates online platform (MSEC: shiny.sesync.org/apps/msec) (S1). We also estimated annual population growth within each buffer between 2000 and 2010. A 100 km buffer was selected as a reasonable scale of human influences on coral reefs (e.g., fishing, water quality and land use) and to match previous global analyses of reef fishes (19)

Gravity. Drawing on economic geography, 'gravity' is an indicator of potential interactions between human populations and coral communities, which accounts for both the size of human populations and accessibility of coral reefs to nearby human settlements and markets. Gravity metrics were estimated using a density-decay function, where the population estimate of the nearest settlement or market was divided by the squared ‘least-cost’ travel time (minutes) between the population and the reef site (S2, S3). Here, we estimated two metrics of gravity within 500 km buffers around each site: (i) the gravity of the nearest human settlement, and (ii) the cumulated gravity of provincial capital cities, major population centers, landmark cities, national capitals, and ports. The gravity of the nearest settlement can provide an indicator of the direct impacts of local fishing, coastal development or land-based runoff, while market gravity can evaluate market-driven influences on coral reef fish biomass and fisheries. A 500 km buffer was chosen as the maximum distance any non-market fishing or land use activities could influence coral reefs.

Local management. We determined the local management of each reef at the time of survey as: openly fished with no access restrictions; restricted management, with some active partial restrictions on fishing gear, catch size, species or access; or fully no-take with full restriction on fishing activities within the borders of a no-take marine reserve. We did not assess management age, size or compliance in this study, and future studies of management rules or the capacity to enforce those rules can provide more information on management effectiveness.

Agricultural use. Using a global land cover database resolved to 5 arc-minutes (~10 km; Global Land Cover Facility, http://glcf.umd.edu/data/lc/), we estimated the percent of land area classified as croplands within a 100 km buffer of each site. We estimated the percent cover of croplands within each buffer in 2012, and the change in percent cover of croplands between 2002 and 2012. Our estimates could be improved by accounting for direct links between watershed catchments, ocean currents and tidal flushing, but this was not possible in the current analysis.

National governance. We used the Human Development Index (HDI) (United Nations Development Program, http://hdr.undp.org/en/content/human-development-index-hdi) as a composite indicator of human development, based on national statistics of life expectancy, education, and per capita income. We also estimated national metrics of GDP per capita and a World Bank Index of Voice and Accountability. National indices can provide some estimate of the resources and capital available to natural resource management and conservation, although it can overlook local tenure and governance in some countries.

Past thermal stress. We assessed thermal stress using Coral Temp, a 32-year record of daily gap-free global sea surface temperatures (SSTs) between 1985 and 2017 at a spatial resolution of 0.05 degrees produced by NOAA's Coral Reef Watch (https://coralreefwatch.noaa.gov/). For each year prior to the date of survey, we determined the maximum annual degree heating weeks (DHWs) and extracted the highest annual value during the entire time series as an indication of the strongest past thermal stress event. We also extracted the calendar year that this event occurred and calculated the number of years between the strongest past thermal anomaly and the year of survey. DHWs are a standard metric used to characterize warming thresholds + 1°C above a baseline summer maximum and commonly used to predict coral bleaching and coral disease outbreaks, and can be highly correlated with other metrics of thermal stress (e.g., HotSpots, summer SSTs and warm season variability) (44).

Primary productivity. Estimates of primary productivity were produced by NOAA Coast Watch (https://coastwatch.pfeg.noaa.gov)and made available by the MSEC online platform (S1).

Data were extracted and processed from 8-day composite layers based on satellite measurements of photosynthetically available radiation, sea surface temperatures, and chlorophyll *a* concentrations; a general mean was estimated for each site between 2003-2013.

Depth. The depth, m, of each survey was identified to the nearest meter by each data provider.

Habitat. We assessed reef habitat as, (i) slope, typically occurring on the ocean side of a reef as it slopes down into deeper waters; (ii) crest, the section that joins the slope and flat, typically associated with higher wave energy; (iii) reef flat, a horizontal habitat that can extend 10s to 100s of meters from the reef to the shore and include lagoon and back reef habitats typically sheltered from wave energy but exposed to high variation in daily tides and temperature. Habitat classifications were provided by each data contributor.

Wave exposure. We estimated the general mean wave energy (kW/m) for each site from NOAA WAVEWATCH III hindcast models, accessed using the MSEC online platform (S1). Wave energy estimates are based on significant wave height, peak period and direction of waves, and the speed and direction of wind using a 31-year dataset (1979-2009) and a 3-hour temporal resolution of measurements.

Cyclones. Disturbances and recovery time associated with tropical cyclones were extracted from a global dataset (1985-2009; S4) For each site, we calculated the maximum annual number of days of potential exposure to extreme cyclone conditions, defined as exposure to gale force winds or higher. We then extracted the highest annual number of extreme cyclone days for each site and recorded the calendar year when each exposure occurred. Our variable of potential recovery time from cyclone influences was the number of years between the maximum cyclone exposure and survey year. Sites with no potential exposure to cyclones through the entire time series (e.g., zero maximum tropical cyclone days, equatorial locations) were recorded as having 30 years of potential recovery time since no cyclone events occurred in the time series.

Habitat connectivity. We extracted the total amount of available reef habitat within a 100 km buffer of each site as the effect of habitat availability or isolation has been identified as a previous driver of regional-scale community assembly for reef corals (S5). We chose 100 km arbitrarily, as previous studies have also shown this scale to have identical results to larger buffers of 200 km and 600 km for reef fish diversity (S5). Estimates were produced from a 500 m gridded global dataset produced by the Reefs at Risk Revisited project of the World Resources Institute and queried from the MSEC online platform (S1).

Supplementary references

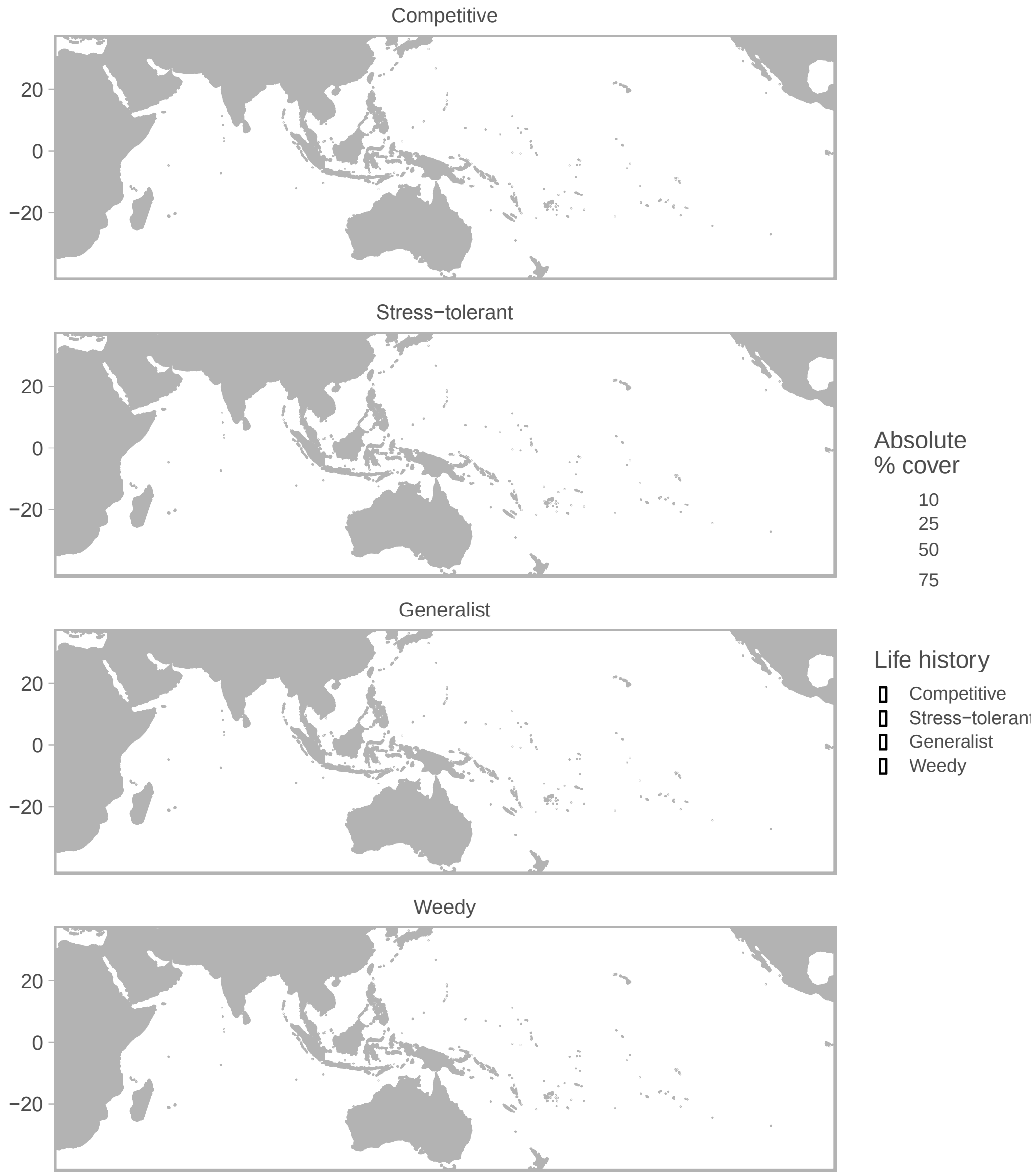
S1. Yeager LA, Marchand P, Gill DA, Baum JK, McPherson JM (2017) Marine socio-environmental covariates: queryable global layers of environmental and anthropogenic variables for marine ecosystem studies. *Ecology* 98(7):1976–1976.

S2. Maire E, et al. (2016) How accessible are coral reefs to people? A global assessment based on travel time. *Ecology Letters* 19(4):351–360.

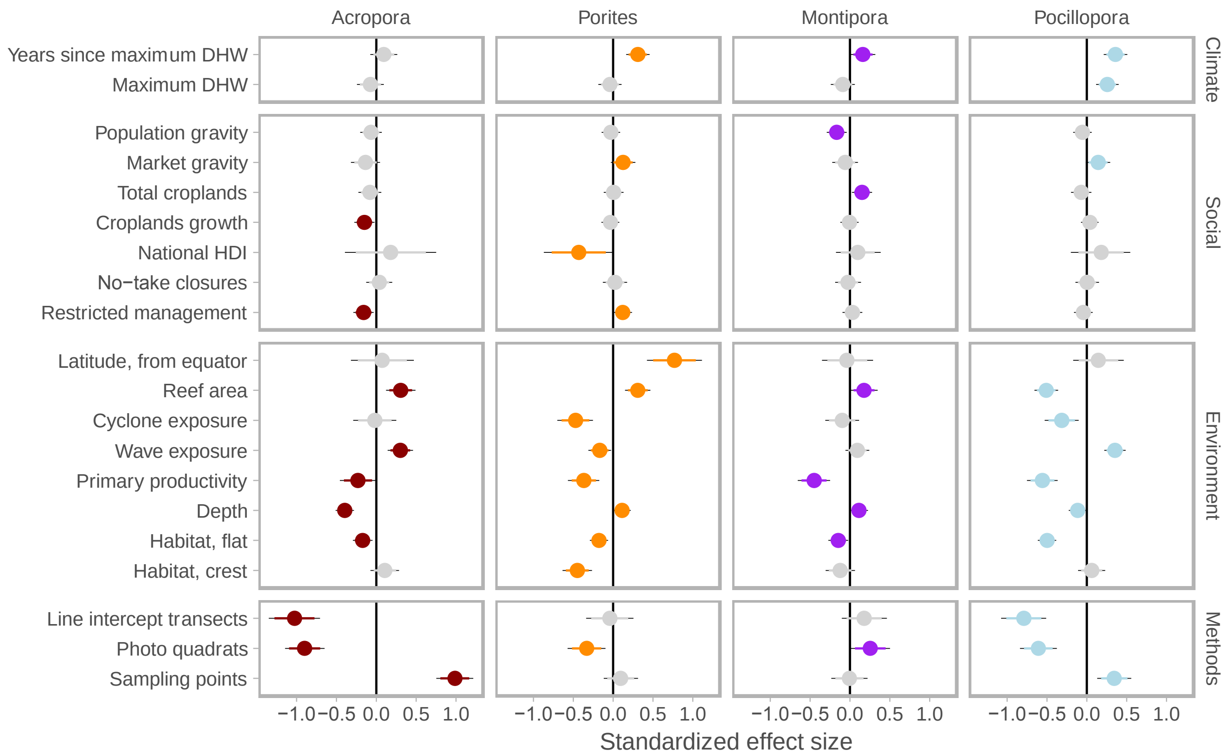
S3. Cinner JE, et al. (2018) Gravity of human impacts mediates coral reef conservation gains. *Proceedings of the National Academy of Sciences* 115(27):E6116–E6125.

S4. Carrigan AD, Puotinen ML (2011) Assessing the potential for tropical cyclone induced sea surface cooling to reduce thermal stress on the world's coral reefs. *Geophysical Research Letters* 38(23):L23604.

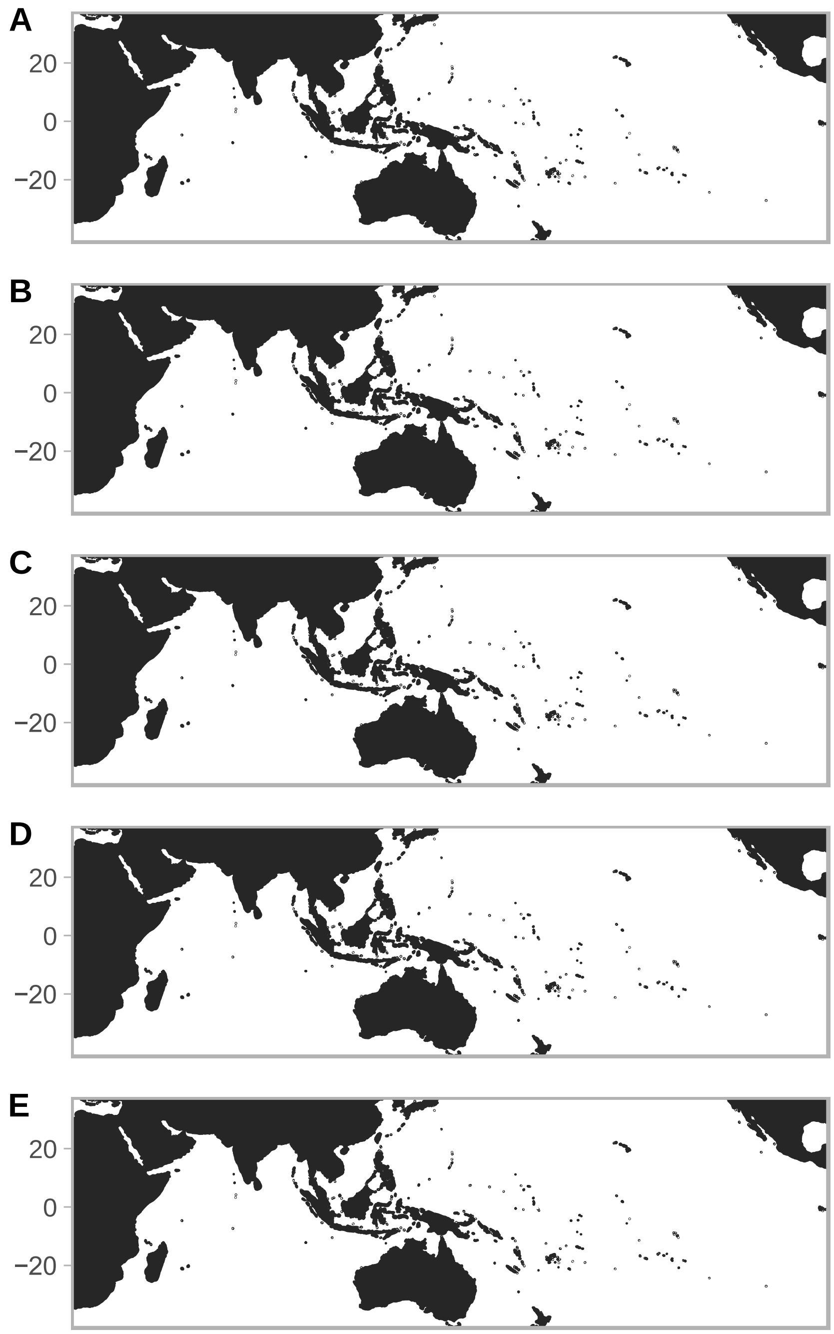
S5. Bellwood DR (2001) Regional-Scale Assembly Rules and Biodiversity of Coral Reefs. *Science* 292(5521):1532–1535.



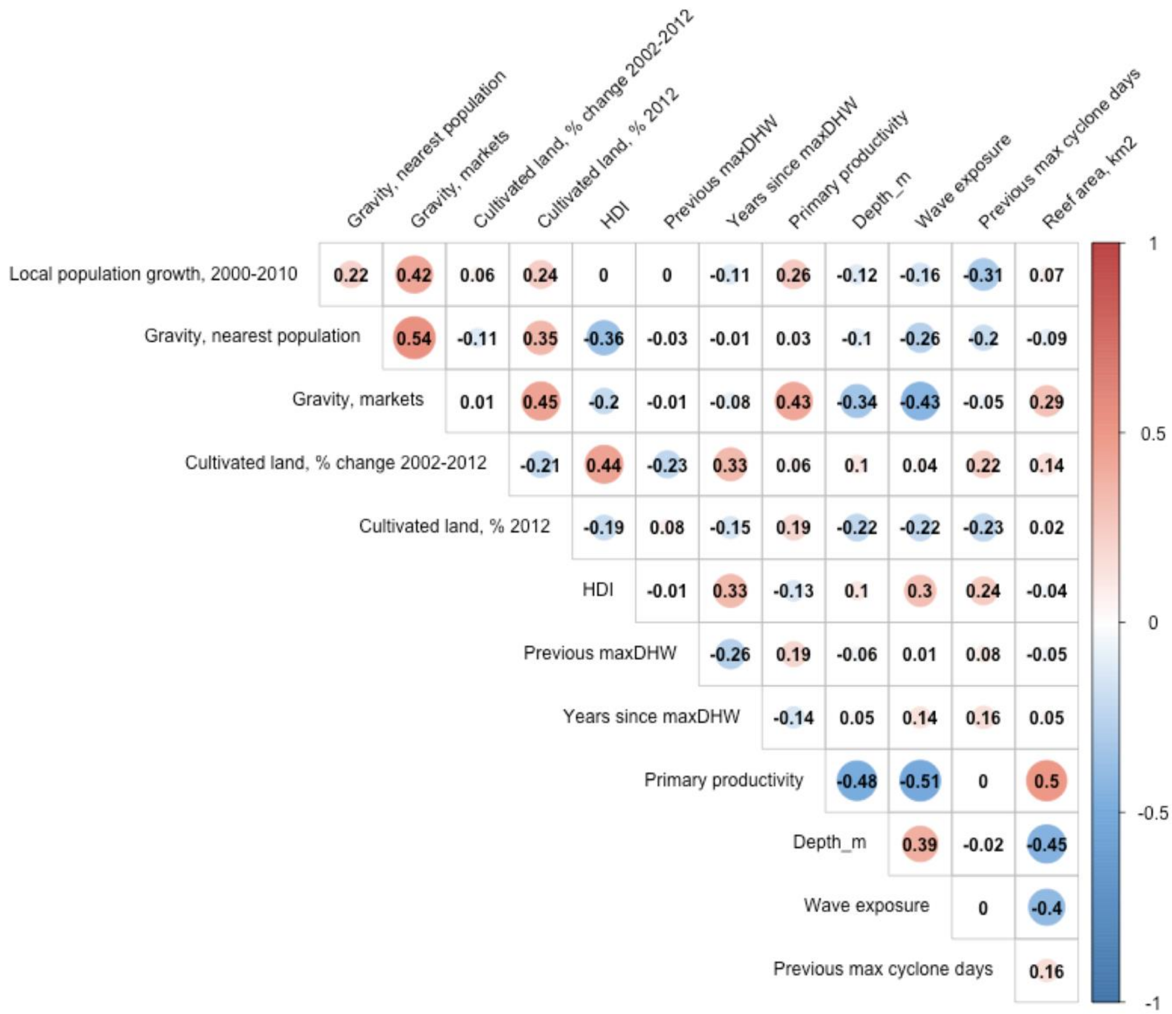
Supplementary Figure 1. Indo-Pacific patterns of reef coral assemblages separated by each life history, based on 2,584 coral reef surveys in 44 nations and territories. Colour indicates life history and circle size indicates percent cover. Points are slightly transparent to show overlapping records.



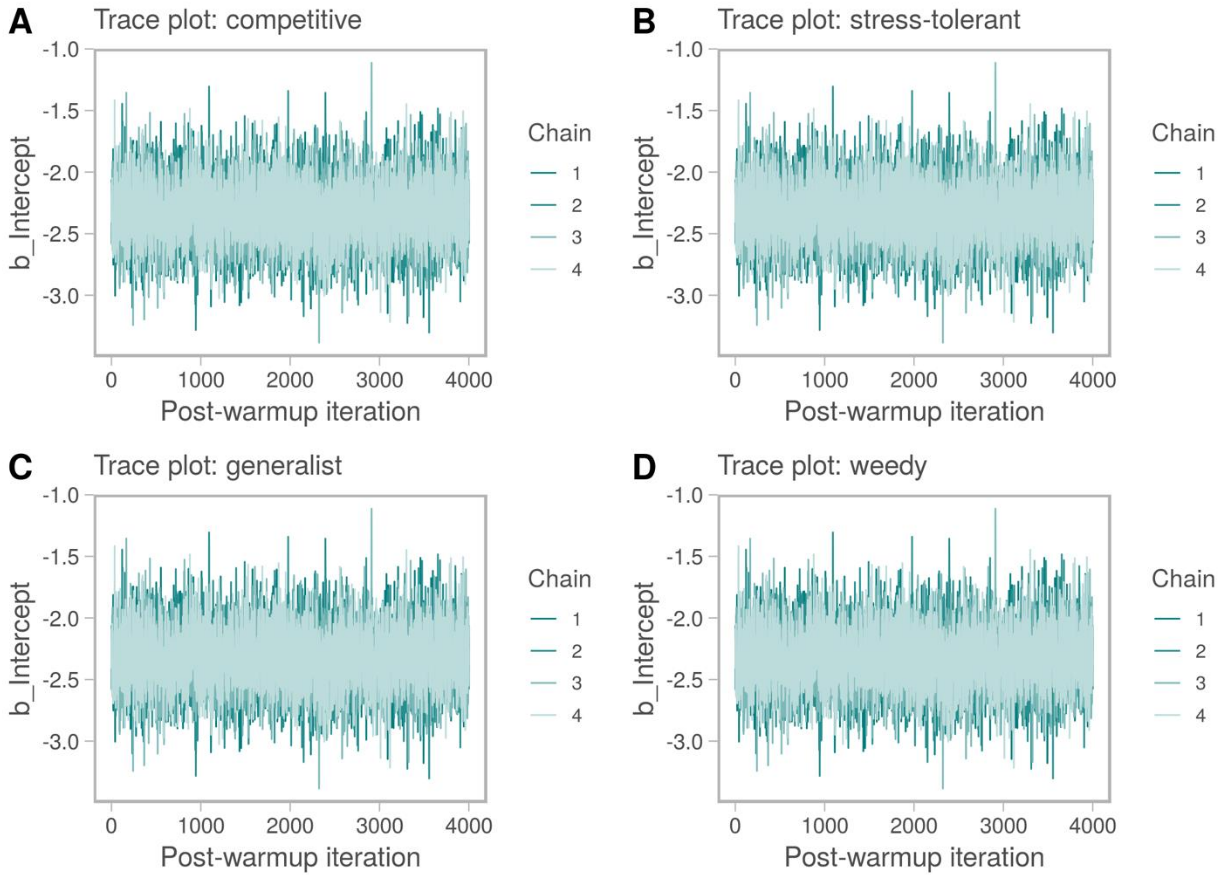
Supplementary Figure 2. Relationship between climate, social, environment and methodology variables for four common coral genera. Standardized effect sizes are Bayesian posterior median values with 95% Bayesian credible intervals (CI; thin black lines) and 80% credible intervals (coloured thicker lines) for 4 chains of 4,000 iterations each. Coloured points indicate the 80% CI does not overlap with zero while grey circles indicate an overlap with zero and a less credible trend. DHW indicates Degree Heating Weeks; HDI indicates the national statistic of Human Development Index.



Supplementary Figure 3. Locations of reefs with a ‘protect’ strategy using different thresholds of degree heating weeks (DHWs) during the 2014-2017 global bleaching event. (A) DHW < 2.0; (B) DHW < 2.5. (C) DHW < 3.0. (D) DHW < 3.5. (E) DHW < 4.0. The maps identify a similar geography of reefs exposed to relatively limited DHWs and coral cover of competitive and stress-tolerant corals > 10%.



Supplementary Figure 4. Correlation plot among continuous social, climate and environment drivers. After accounting for multicollinearity, all correlation coefficients are less than 0.55, and variance inflation factors are less than 2.5, indicating multicollinearity between covariates is not an issue in the full model set of drivers (see Extended Data Table 1 for detailed description of drivers, and Extended Data Table 2 for analysis of variance inflation factors).



Supplementary Figure 5. Trace plots of Bayesian models for coral life histories. Mixing is shown for the Intercept parameter *b* across four chains of 5,000 iterations each, where the first 1,000 iterations of each chain were discarded as warm up iterations.

Supplementary Table 1. Comparison of random and empirical sampling of coral communities. Randomly sampled points were selected from 500 m grid of coral reef distribution in the Indo-Pacific, compared to the number of randomly selected points from the empirical dataset (*n* = 2,584 reefs), and summarized by ecoregion. Relative undersampling for an ecoregion is indicated by negative level of sampling, and positive values indicate relative oversampling.

Ecoregion	Randomly sampled site counts	Empirically sampled site counts	Percentage of randomly sampled reefs	Percentage of empirically sampled reefs	Level of sampling (%)
Palawan/North Borneo	184	0	7.1%	0.0%	-7.1%
Torres Strait Northern GBR	195	37	7.5%	1.4%	-6.1%
Eastern Philippines	116	1	4.5%	0.0%	-4.4%
Banda Sea	114	0	4.4%	0.0%	-4.4%
Northern and Central Red Sea	89	18	3.4%	0.7%	-2.7%
Solomon Archipelago	87	20	3.3%	0.8%	-2.6%
Sulawesi Sea/Makassar Strait	87	20	3.3%	0.8%	-2.6%
Solomon Sea	66	0	2.5%	0.0%	-2.5%
South China Sea Oceanic Islands	53	2	2.0%	0.1%	-2.0%
Tuamotus	53	4	2.0%	0.2%	-1.9%
Southern Red Sea	58	12	2.2%	0.5%	-1.8%
Sunda Shelf/Java Sea	67	34	2.6%	1.3%	-1.3%
Bismarck Sea	54	24	2.1%	0.9%	-1.1%
Halmahera	26	0	1.0%	0.0%	-1.0%
Vanuatu	31	6	1.2%	0.2%	-1.0%
Papua	33	8	1.3%	0.3%	-1.0%
Bonaparte Coast	23	0	0.9%	0.0%	-0.9%
Southeast Papua New Guinea	23	0	0.9%	0.0%	-0.9%
Arabian (Persian) Gulf	28	6	1.1%	0.2%	-0.8%
East African Coral Coast	70	48	2.7%	1.9%	-0.8%
Andaman and Nicobar Islands	31	10	1.2%	0.4%	-0.8%
Coral Sea	16	0	0.6%	0.0%	-0.6%
Gilbert/Ellis Islands	46	30	1.8%	1.2%	-0.6%
Arnhem Coast to Gulf of Carpentaria	15	0	0.6%	0.0%	-0.6%
Western Sumatra	39	24	1.5%	0.9%	-0.6%
Gulf of Aden	12	0	0.5%	0.0%	-0.5%
Northern Monsoon Current Coast	12	0	0.5%	0.0%	-0.5%
Gulf of Tonkin	10	0	0.4%	0.0%	-0.4%
Northeast Sulawesi	9	0	0.3%	0.0%	-0.3%
Arafura Sea	7	0	0.3%	0.0%	-0.3%
Southern Java	7	0	0.3%	0.0%	-0.3%
South India and Sri Lanka	6	0	0.2%	0.0%	-0.2%
East Caroline Islands	60	55	2.3%	2.1%	-0.2%
Cargados Carajos/Tromelin Island	4	0	0.2%	0.0%	-0.2%
Central Kuroshio Current	4	0	0.2%	0.0%	-0.2%
Houtman	4	0	0.2%	0.0%	-0.2%
Western India	4	0	0.2%	0.0%	-0.2%
Northern Bay of Bengal	3	0	0.1%	0.0%	-0.1%
Southern Vietnam	3	0	0.1%	0.0%	-0.1%
Bight of Sofala/Swamp Coast	5	2	0.2%	0.1%	-0.1%
Southeast Madagascar	2	0	0.1%	0.0%	-0.1%
Western Arabian Sea	2	0	0.1%	0.0%	-0.1%
Malacca Strait	14	12	0.5%	0.5%	-0.1%
Gulf of Papua	1	0	0.0%	0.0%	0.0%

Ecoregion	Randomly sampled site counts	Empirically sampled site counts	Percentage of randomly sampled reefs	Percentage of empirically sampled reefs	Level of sampling (%)
Leeuwin	1	0	0.0%	0.0%	0.0%
Southern Cook/Austral Islands	3	2	0.1%	0.1%	0.0%
Mascarene Islands	5	4	0.2%	0.2%	0.0%
East China Sea	4	4	0.2%	0.2%	0.0%
Southern China	6	6	0.2%	0.2%	0.0%
Maldives	64	64	2.5%	2.5%	0.0%
Western and Northern Madagascar	69	69	2.7%	2.7%	0.0%
Marquesas	0	1	0.0%	0.0%	0.0%
Society Islands	7	8	0.3%	0.3%	0.0%
Seychelles	20	21	0.8%	0.8%	0.0%
West Caroline Islands	18	20	0.7%	0.8%	0.1%
New Caledonia	86	88	3.3%	3.4%	0.1%
Manning-Hawkesbury	0	3	0.0%	0.1%	0.1%
Gulf of Oman	2	6	0.1%	0.2%	0.2%
Chagos	32	36	1.2%	1.4%	0.2%
South Kuroshio	22	27	0.8%	1.0%	0.2%
Shark Bay	4	13	0.2%	0.5%	0.3%
Ningaloo	2	14	0.1%	0.5%	0.5%
Tweed-Moreton	1	14	0.0%	0.5%	0.5%
Gulf of Thailand	5	19	0.2%	0.7%	0.5%
Phoenix/Tokelau/Northern Cook Islands	8	23	0.3%	0.9%	0.6%
Delagoa	1	24	0.0%	0.9%	0.9%
Clipperton	0	28	0.0%	1.1%	1.1%
Andaman Sea Coral Coast	14	43	0.5%	1.7%	1.1%
Cocos-Keeling/Christmas Island	3	37	0.1%	1.4%	1.3%
Marshall Islands	47	84	1.8%	3.3%	1.4%
Easter Island	0	40	0.0%	1.5%	1.5%
Revillagigedos	0	42	0.0%	1.6%	1.6%
Lord Howe and Norfolk Islands	1	45	0.0%	1.7%	1.7%
Central and Southern Great Barrier Reef	184	236	7.1%	9.1%	2.1%
Tonga Islands	17	71	0.7%	2.7%	2.1%
Samoa Islands	9	69	0.3%	2.7%	2.3%
Exmouth to Broome	14	94	0.5%	3.6%	3.1%
Line Islands	10	92	0.4%	3.6%	3.2%
Mariana Islands	5	95	0.2%	3.7%	3.5%
Lesser Sunda	41	168	1.6%	6.5%	4.9%
Hawaii	50	193	1.9%	7.5%	5.5%
Rapa-Pitcairn	1	152	0.0%	5.9%	5.8%
Fiji Islands	71	256	2.7%	9.9%	7.2%
Grand Total	2600	2584	100.0%	100.0%	0.0% (average)

Supplementary Table 2. List of scleractinian species identified to four life history 'types'. Classifications were based on published species traits including colony growth form, growth rate, maximum size and reproduction to derive species-level classifications *(4)* and updated by genera-level classifications informed by expert opinion *(18)*.

Life history	Species
Competitive	*Acropora abrolhosensis, Acropora abrotanoides, Acropora aculeus, Acropora acuminata, Acropora anthocercis, Acropora aspera, Acropora austera, Acropora azurea, Acropora carduus, Acropora caroliniana, Acropora cerealis, Acropora chesterfieldensis, Acropora clathrata, Acropora corymbose, Acropora cytherea, Acropora digitate, Acropora digitifera, Acropora divaricata, Acropora donei, Acropora echinata, Acropora elseyi, Acropora eurystoma, Acropora florida, Acropora gemmifera, Acropora glauca, Acropora globiceps, Acropora grandis, Acropora granulosa, Acropora hispidose, Acropora horrida, Acropora humilis, Acropora hyacinthus, Acropora intermedia, Acropora japonica, Acropora kimbeensis, Acropora latistella, Acropora listeri, Acropora lokani, Acropora longicyathus, Acropora loripes, Acropora lutkeni, Acropora microclados, Acropora microphthalma, Acropora millepora, Acropora monticulosa, Acropora muricata, Acropora nana, Acropora nasuta, Acropora natalensis, Acropora palmerae, Acropora paniculata, Acropora papillare, Acropora pectinata, Acropora polystoma, Acropora pulchra, Acropora retusa, Acropora robusta, Acropora roseni, Acropora rudis, Acropora samoensis, Acropora sarmentosa, Acropora secale, Acropora selago, Acropora solitaryensis, Acropora speciosa, Acropora spicifera, Acropora striata, Acropora subglabra, Acropora subulata, Acropora tenuis, Acropora tortuosa, Acropora valenciennesi, Acropora valida, Acropora vaughani, Acropora verweyi, Acropora willisae, Acropora yongei, Hydnophora rigida, Isopora crateriformis, Isopora cuneata, Isopora elizabethensis, Isopora palifera, Montipora capitata, Montipora digitata, Montipora hispida, Montipora incrassata, Montipora mollis, Montipora samarensis, Montipora spongodes, Montipora spumosa, Montipora stellata, Montipora turgescens, Montipora undata*
Generalist	*Cycloseris explanulata, Cyphastrea agassizi, Cyphastrea chalcidicum, Cyphastrea decadia, Cyphastrea japonica, Cyphastrea microphthalma, Cyphastrea ocellina, Cyphastrea serailia, Echinopora gemmacea, Echinopora hirsutissima, Echinopora horrida, Echinopora lamellosa, Echinopora mammiformis, Echinopora pacificus, Hydnophora exesa, Hydnophora microconos, Isopora cuneata, Isopora palifera, Leptastrea bewickensis, Leptastrea inaequalis, Leptastrea pruinosa, Leptastrea purpurea, Leptastrea transversa, Merulina ampliata, Merulina scabricula, Montipora aequituberculata, Montipora australiensis, Montipora calcarea, Montipora corbettensis, Montipora crassituberculata, Montipora danae, Montipora florida, Montipora foliosa, Montipora foveolata, Montipora grisea, Montipora hoffmeisteri, Montipora informis, Montipora lobulata, Montipora mactanensis, Montipora monasteriata, Montipora nodosa, Montipora orientalis, Montipora peltiformis, Montipora tuberculosa, Montipora turtlensis, Montipora verrucosa, Mycedium elephantotus, Mycedium mancaoi, Oxypora glabra, Oxypora lacera, Pachyseris rugosa, Pachyseris speciosa, Pavona bipartita, Pavona cactus, Pavona chiriquensis, Pavona clavus, Pavona decussata, Pavona duerdeni, Pavona explanulata, Pavona frondifera, Pavona maldivensis, Pavona minuta, Pavona varians, Pavona venosa, Pectinia alcicornis, Pectinia lactuca, Pectinia paeonia, Pocillopora aliciae, Pocillopora grandis, Pocillopora ligulata, Pocillopora meandrina, Pocillopora verrucosa, Pocillopora woodjonesi, Podabacia crustacea, Podabacia motuporensis, Psammocora contigua, Psammocora digitata, Psammocora haimiana, Psammocora nierstraszi, Psammocora profundacella, Psammocora stellata, Turbinaria bifrons, Turbinaria frondens, Turbinaria heronensis, Turbinaria mesenterina, Turbinaria patula, Turbinaria peltata, Turbinaria radicalis, Turbinaria reniformis, Turbinaria stellulata*
Stress-tolerant	*Acanthastrea echinata, Acanthastrea hemprichii, Acanthastrea pachysepta, Alveopora allingi, Alveopora tizardi, Astrea annuligera, Astrea curta, Astreopora cucullata, Astreopora listeri, Astreopora myriophthalma, Astreopora ocellata, Astreopora randalli, Astreopora scabra, Australogyra zelli, Bernardpora stutchburyi, Blastomussa wellsi, Caulastraea furcata, Coelastrea aspera, Coelastrea palauensis, Coeloseris mayeri, Coscinaraea columna, Coscinaraea exesa, Coscinaraea monile, Ctenactis albitentaculata, Cycloseris mokai, Danafungia horrida, Diploastrea heliopora, Dipsastrea amicorum, Dipsastrea danai, Dipsastrea faviaformis, Dipsastrea favus, Dipsastrea laxa, Dipsastrea lizardensis, Dipsastrea matthaii, Dipsastrea maxima, Dipsastrea pallida, Dipsastrea rotumana, Dipsastrea rotundata, Dipsastrea speciosa, Dipsastrea veroni, Dipsastrea vietnamensis, Echinophyllia aspera, Echinophyllia echinata, Echinophyllia echinoporoides, Echinophyllia orpheensis, Euphyllia ancora, Euphyllia divisa, Euphyllia glabrescens, Favites abdita, Favites chinensis, Favites complanata, Favites flexuosa, Favites*

Life history	Species
	halicora, Favites magnistellata, Favites pentagona, Favites valenciennesi, Favites vasta, Fungia fungites, Galaxea astreata, Galaxea fascicularis, Galaxea horrescens, Gardineroseris planulata, Goniastrea edwardsi, Goniastrea favulus, Goniastrea minuta, Goniastrea pectinata, Goniastrea retiformis, Goniastrea stelligera, Goniopora djiboutiensis, Goniopora fruticosa, Goniopora lobata, Goniopora pedunculata, Goniopora somaliensis, Goniopora tenuidens, Halomitra pileus, Herpolitha limax, Homophyllia bowerbanki, Leptoria irregularis, Leptoria phrygia, Leptoseris explanata, Leptoseris foliosa, Leptoseris hawaiiensis, Leptoseris incrustans, Leptoseris mycetoseroides, Leptoseris papyracea, Leptoseris scabra, Leptoseris solida, Leptoseris yabei, Lithophyllon concinna, Lithophyllon repanda, Lithophyllon scabra, Lithophyllon undulatum, Lobactis scutaria, Lobophyllia agaricia, Lobophyllia corymbosa, Lobophyllia hataii, Lobophyllia hemprichii, Lobophyllia radians, Lobophyllia recta, Lobophyllia robusta, Lobophyllia vitiensis, Micromussa amakusensis, Micromussa lordhowensis, Micromussa regularis, Montipora caliculata, Montipora efflorescens, Montipora flabellata, Montipora floweri, Montipora meandrina, Montipora millepora, Montipora patula, Montipora venosa, Oulophyllia crispa, Paragoniastrea australensis, Paragoniastrea russelli, Paramontastrea annuligera, Paramontastrea serageldini, Physogyra lichtensteini, Platygyra contorta, Platygyra daedalea, Platygyra lamellina, Platygyra pini, Platygyra sinensis, Platygyra verweyi, Platygyra yaeyamaensis, Plerogyra sinuosa, Plesiastrea versipora, Pleuractis granulosa, Pleuractis paumotensis, Porites annae, Porites arnaudi, Porites australiensis, Porites brighami, Porites evermanni, Porites gabonensis, Porites lichen, Porites lobata, Porites lutea, Porites mayeri, Porites monticulosa, Porites myrmidonensis, Porites profundus, Porites randalli, Porites sillimaniani, Porites stephensoni, Stylocoeniella armata, Stylocoeniella guentheri
Weedy	*Pocillopora damicornis, Porites attenuata, Porites compressa, Porites cylindrica, Porites heronensis, Porites nigrescens, Porites rus, Porites vaughani, Seriatopora caliendrum, Seriatopora hystrix, Seriatopora stellata, Stylophora pistillata*

Supplementary Table 3. Summary of human, climate and environmental covariates.

Covariate	Description	Scale	Rationale
Local population growth	Population growth was estimated as the change in population density between 2000 and 2010 within a 100 km buffer	Site	Population growth can increase the influence of local human populations on coral reefs through increases in fishing, pollution and coastal development
Gravity of nearest human settlement	The population of the nearest human settlement divided by the squared travel time between the reef site and the settlement	Site	Gravity' is an indicator of human use and fishing pressure related to the size and accessibility of coral reefs to nearby human settlements and markets. In a global study, Cinner et al. (2016) identified market gravity as the strongest determinant of reef fish biomass
Market gravity	The population of a major market divided by the squared travel time between a reef site and market This value was summed for all major markets within 500 km of the site	Site	
Management	Whether the reef is open access (fished), restricted (some gear or access restrictions) or no-take (full restriction on fishing with high compliance)	Reef	No-take marine reserves or other management restrictions can limit the direct and indirect effects of fishing on coral communities
Cultivated land	Percent of land area classified as croplands with a 100 km buffer -- two variables calculated: total % cover in 2012, and change in % cover between 2002 and 2012	Site	Land conversion to agriculture or crops can increase the flow of sediments, nutrients and pesticides to reefs, which can directly affect coral growth and mortality, or can disrupt coral-algae competitive dynamics
Human Development Index (HDI)	A composite statistic of life expectancy, education, and per capita income Higher HDIs are scored when the lifespan is higher, the education level is higher, and the GDP per capita is higher	Country	Countries with higher HDI scores may have greater social and financial resources to operationalize natural resource management. Although this metric does not account for some lower-HDI countries with strong customary management of natural resources
GDP per capita	Average GDP per capita in 2014, current prices USD	Country	National financial assets can inform the resources that a country can use to assist in the governance of coral reef resources and mitigation or adaptation of human threats.
Voice and accountability	World Bank index that describes the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media	Country	If citizens can make decisions that can mitigate local impacts through policy mechanisms, we hypothesize that nations with stronger national or state governance might better mitigate human influences on coral reefs
Past magnitude of thermal exposure	Highest maximum annual Degree Heating Week (DHWs) in all years between 1985 and year of survey	Site	Degree Heating Weeks (DHWs) can characterize extreme thermal stress that can directly affect coral assemblages through mortality. The number of years between disturbances is an indicator of potential recovery time for coral assemblages
Years since maximum thermal stress	The number of years between maximum past DHW and year of survey	Reef	
Primary productivity	Average ocean productivity between 2003 and 2013 in mg C /m2/ day estimated from satellite measurements of photosynthetically available radiation, sea surface temperatures, and chlorophyll a concentrations	Site	Primary productivity can influence coral growth, community assembly patterns, and recovery from disturbances

Depth, m	Depth of the ecological survey, meters	Reef	Depth influences light scatter for reef growth, local temperature and patterns of community assembly. Depth may also influence exposure to coral bleaching (cooler waters) or to cyclones and waves
Habitat	Reef flat (includes lagoon and back reef habitats), reef slope or reef crest	Reef	Habitat is a strong determinant of coral reef community structure by moderating temperature variability and wave exposure
Wave exposure	Mean wave energy (kW/m) calculated from hindcast WAVEWATCH III data (1979-2009)	Site	Wave energy can moderate coral communities in their tolerance to physical disturbance
Cyclone days	The maximum number of days in a single year of potential exposure to extreme cyclone conditions, during a time series from 1985 to one year prior to the survey Extreme cyclone conditions are defined as exposure to a minimum threshold of gale force winds or higher	Site	Tropical cyclone waves can severely damage coral reefs and alter community structure or in some instances provide beneficial cooling from high SSTs. The amount of exposure can inform cyclone damage or potential cooling, and years since cyclones can inform potential recovery
Years since maximum cyclone	Number of years between maximum exposure to extreme cyclone conditions and year of survey	Reef	
Connectivity to other reefs	Reef area (km2) within a 100 km buffer of each site	Site	Habitat area available to coral reefs has been associated with higher biodiversity of reef fish and coral assemblages at regional scales
Method	Whether the survey used a point intercept transect, line intercept transect or photo quadrat method	Site	Methodological differences may account for sampling noise associated with the dataset
Total sampling points	Total number of sampling points for the survey, which integrates transect length, number of transect replicates and sampling intensity	Site	Sampling effort is expected to be an important influence on coral abundance and diversity recorded on each survey
Latitude	Latitude of ecological survey	Site	Latitude is correlated with solar radiation, temperature, and aragonite saturation, and can serve as a proxy for environmental gradients of substrate type, wave energy, salinity and water quality
Faunal province	Biogeographic faunal province of survey, based on co-occurrence of multiple species boundaries	Site	Indo-Pacific corals can be characterized within 11 distinct faunal provinces evaluated from the co-occurrence of multiple species' range limits

Supplementary Table 4. Bayesian R^2 values from Bayesian applied regression models fit with Stan models for (a) total coral cover and life histories and (b) common coral genera. Bayesian R^2 is an estimate of the proportion of variance explained by a model, and estimated as the expected predicted variance divided by the expected predicted variance plus error variance (Gelman et al. unpublished, http://www.stat.columbia.edu/~gelman/research/published/bayes_R2_v3.pdf)

	Bayesian R^2	**Error**
(a) Total cover and life history		
Total coral cover	0.482	0.014
Competitive	0.403	0.017
Stress tolerant	0.404	0.018
Generalist	0.253	0.022
Weedy	0.372	0.023
(b) Genus		
Acropora	0.414	0.020
Porites	0.351	0.026
Montipora	0.295	0.033
Pocillopora	0.306	0.027

Supplementary Table 5. Sensitivity analysis comparing the three management strategies (*protect – recover – transform*) across different thresholds of ecological condition related to net-positive carbonate production. Analyses in the main text use a 10% threshold of live cover of competitive and stress-tolerant corals. Here, we show the distribution of reefs (total out of 2584, N; and percent, %) using an 8% or 12% threshold of coral cover.

	10% cover		8% cover		12% cover	
	N reefs	% of reefs	N reefs	% of reefs	N reefs	% of reefs
Protect	449	17.38	490	18.96	408	15.79
Recover	1407	54.45	1522	58.90	1305	50.50
Transform	728	28.17	572	22.14	871	33.71

Supplementary Table 6. Location of 449 reefs with a '*protect'* strategy, identified by country, site, dominance of coral community (with a 10% cover threshold) and thermal stress <4 DHW during the 2014-2017 global coral bleaching event. These reefs are located within 25 nations (including overseas territories) and under the governing jurisdiction of 22 countries.

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Africa-India	France, Iles Eparses	Europa4	56.15	Competitive	2.46
Africa-India	France, Iles Eparses	Europa2	49.28	Stresstolerant	2.55
Africa-India	France, Iles Eparses	Europa5	48.00	Stresstolerant	2.54
Africa-India	France, Iles Eparses	Europa6	46.71	Stresstolerant	2.54
Africa-India	France, Iles Eparses	Europa3	45.54	Competitive	2.54
Africa-India	France, Iles Eparses	Europa7	33.69	Stresstolerant	2.68
Africa-India	France, Iles Eparses	Europa1	25.91	Stresstolerant	2.54
Africa-India	India	Black Tangs_Deep	40.45	Stresstolerant	3.04
Africa-India	India	Lighthouse_Deep	36.23	Stresstolerant	3.04
Africa-India	India	Black Tangs_Shallow	31.27	Stresstolerant	3.04
Africa-India	India	Lighthouse_Shallow	27.91	Competitive	3.04
Africa-India	India	Cave_Shallow	21.14	Stresstolerant	3.68
Africa-India	India	Japanese Garden_Shallow	18.45	Stresstolerant	2.79
Africa-India	India	Japanese Garden_Deep	18.20	Stresstolerant	2.79
Africa-India	India	Cave_Deep	16.55	Stresstolerant	3.68
Africa-India	India	The Groove_Deep	15.38	Stresstolerant	3.05
Africa-India	India	The Groove_Shallow	14.30	Stresstolerant	3.05
Africa-India	India	Potato Patch_Shallow	10.78	Stresstolerant	3.68
Africa-India	Kenya	Kibuyuni B	29.85	Stresstolerant	2.60
Africa-India	Kenya	Changai	29.79	Stresstolerant	2.60
Africa-India	Kenya	Mradi 2	26.01	Stresstolerant	1.10
Africa-India	Kenya	Mtangata 2	23.47	Stresstolerant	1.77
Africa-India	Kenya	Chale Mwaromba 1	23.40	Stresstolerant	1.61
Africa-India	Kenya	Kibuyuni A	22.64	Stresstolerant	2.60
Africa-India	Kenya	Kanamai 2	19.70	Stresstolerant	1.07
Africa-India	Kenya	Mtangata 1	17.54	Stresstolerant	1.77
Africa-India	Kenya	Msumarini 1	17.44	Stresstolerant	1.06
Africa-India	Kenya	Mwaepe 1	16.66	Stresstolerant	1.61
Africa-India	Kenya	Mombasa 1	16.03	Stresstolerant	1.26
Africa-India	Kenya	Mradi 1	15.40	Stresstolerant	1.10
Africa-India	Kenya	Mvuleni Mecca 1	14.41	Stresstolerant	1.61
Africa-India	Kenya	Vipingo 1	14.20	Stresstolerant	1.29
Africa-India	Kenya	Msumarini 2	12.58	Stresstolerant	1.06
Africa-India	Kenya	Vanga	12.54	Stresstolerant	3.51
Africa-India	Kenya	Malindi 2	11.88	Stresstolerant	2.54
Africa-India	Kenya	Mombasa 2	10.15	Stresstolerant	1.26
Africa-India	Madagascar	Frere 2	79.00	Competitive	3.74
Africa-India	Madagascar	Soeur 1	61.04	Competitive	3.91
Africa-India	Madagascar	South Tsarajabina	55.10	Competitive	3.91
Africa-India	Madagascar	Smahasaha ext	51.20	Competitive	1.46
Africa-India	Madagascar	Frere 1	45.21	Stresstolerant	3.91
Africa-India	Madagascar	Coco_Salary ext	44.87	Stresstolerant	1.76
Africa-India	Madagascar	Wmahasaha ND	20.01	Stresstolerant	1.46
Africa-India	Madagascar	Anjokojoko ext	19.59	Competitive	1.76
Africa-India	Madagascar	Ravenome ND	10.58	Stresstolerant	1.31
Africa-India	Mozambique	Bazaruto_2mileReef	42.03	Competitive	2.64

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Africa-India	Mozambique	Pomene_Trojan	35.03	Competitive	0.15
Africa-India	Mozambique	Bazaruto_Lighthouse1	34.84	Competitive	2.10
Africa-India	Mozambique	Bazaruto_5mileReef	33.79	Competitive	2.78
Africa-India	Mozambique	Mahangate_Africa_Bank	30.94	Competitive	0.75
Africa-India	Mozambique	SAN SEBASTIAN_Lighthouse	28.75	Competitive	0.95
Africa-India	Mozambique	Bazaruto_North_SailfishBay	26.61	Competitive	2.49
Africa-India	Mozambique	Magaruque_Baluba	21.55	Stresstolerant	2.29
Africa-India	Mozambique	Bazaruto_25mileReef	21.42	Stresstolerant	1.96
Africa-India	Mozambique	Bazaruto_SailfishBay	20.88	Competitive	2.49
Africa-India	Mozambique	Bazaruto_Queenies	18.20	Stresstolerant	1.96
Africa-India	Mozambique	Pomene_Rappies	15.70	Competitive	0.78
Africa-India	Mozambique	SAN SEBASTIAN_Bump	13.92	Stresstolerant	1.26
Africa-India	Mozambique	Masinga_Masinga1	12.88	Stresstolerant	0.97
Africa-India	Mozambique	Bazaruto_Lighthouse2	11.11	Stresstolerant	2.10
Africa-India	Tanzania	Makome North 1	59.50	Stresstolerant	1.82
Africa-India	Tanzania	Dambwe 1	40.16	Stresstolerant	2.50
Africa-India	Tanzania	Maziwe S 1	37.43	Stresstolerant	2.17
Africa-India	Tanzania	Taa 1	35.60	Stresstolerant	1.67
Africa-India	Tanzania	Makome South 1	27.66	Stresstolerant	1.82
Africa-India	Tanzania	Makome temp 1	26.76	Stresstolerant	2.17
Africa-India	Tanzania	Chanjale 1	22.81	Stresstolerant	1.67
Africa-India	Tanzania	Maziwe N 1	17.36	Stresstolerant	2.17
Africa-India	Tanzania	Makome 1	14.25	Stresstolerant	1.82
Australian	Australia	Cape Farquhar	61.07	Competitive	1.63
Australian	Australia	Knuckle Reef	57.45	Competitive	1.21
Australian	Australia	Turquoise	39.98	Competitive	3.09
Australian	Australia	Hardy Reef 3	39.31	Competitive	2.26
Australian	Australia	Pelican	38.44	Competitive	2.86
Australian	Australia	M3	37.80	Competitive	3.92
Australian	Australia	GK9	36.91	Competitive	3.92
Australian	Australia	Knuckle Reef 2	35.94	Competitive	1.21
Australian	Australia	Middleton8_3m	34.88	Competitive	3.39
Australian	Australia	Flinders Reef	34.01	Competitive	3.63
Australian	Australia	Bruboodjoo	30.70	Competitive	3.35
Australian	Australia	Middleton6_4m	30.42	Competitive	3.23
Australian	Australia	Middleton9_4m	30.42	Competitive	2.97
Australian	Australia	Inner Gneering Shoals	28.20	Stresstolerant	2.10
Australian	Australia	M4	27.80	Competitive	3.92
Australian	Australia	Middleton4_1m	26.68	Competitive	2.97
Australian	Australia	Stevens Hole_2m	26.50	Competitive	1.73
Australian	Australia	Winderabandi	23.99	Competitive	3.00
Australian	Australia	Middleton9_10m	23.88	Competitive	2.97
Australian	Australia	Little Black Reef	23.38	Competitive	2.07
Australian	Australia	North Bay_2m	22.80	Competitive	1.94
Australian	Australia	Mudjimba	22.42	Stresstolerant	1.79
Australian	Australia	Net Reef	22.07	Competitive	1.11
Australian	Australia	Middleton6_10m	20.55	Stresstolerant	3.23
Australian	Australia	Erscotts_3m	19.83	Competitive	1.73
Australian	Australia	Middleton7_4m	19.27	Competitive	2.97
Australian	Australia	Middleton7_10m	19.15	Stresstolerant	2.97

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Australian	Australia	Bundera	19.01	Competitive	2.99
Australian	Australia	Stevens Hole_8m	18.97	Competitive	1.73
Australian	Australia	North Bay_8m	18.63	Competitive	1.94
Australian	Australia	Oyster Stacks 1	18.23	Competitive	3.09
Australian	Australia	Middleton8_9m	18.10	Stresstolerant	3.39
Australian	Australia	Osprey	18.07	Competitive	3.12
Australian	Australia	Potholes_8m	18.03	Competitive	1.73
Australian	Australia	Nth Passage South_8m	17.80	Competitive	1.94
Australian	Australia	Stevens Hole_3m	17.63	Competitive	1.73
Australian	Australia	Bait Reef 2	17.57	Stresstolerant	3.24
Australian	Australia	Fairey Reef 2	17.28	Stresstolerant	1.31
Australian	Australia	Coral Bay	17.21	Competitive	2.71
Australian	Australia	Erscott_8m	16.75	Competitive	1.73
Australian	Australia	Lefroy Bay	16.31	Competitive	3.00
Australian	Australia	South West Solitary Island	16.10	Stresstolerant	3.01
Australian	Australia	South Solitary Island	15.98	Competitive	3.23
Australian	Australia	North Passage_3m	15.87	Competitive	1.94
Australian	Australia	Fairey Reef	15.78	Stresstolerant	1.31
Australian	Australia	Mid2_20	15.47	Stresstolerant	2.14
Australian	Australia	North Solitary Island	15.38	Stresstolerant	2.62
Australian	Australia	North West Solitary Island	15.25	Stresstolerant	3.19
Australian	Australia	Nth Passage South_2m	15.23	Competitive	1.94
Australian	Australia	Pot Holes_2m	15.20	Competitive	1.73
Australian	Australia	Middleton5_10m	12.55	Stresstolerant	3.00
Australian	Australia	Turquoise Bay 1	12.28	Stresstolerant	3.09
Australian	Papua New Guinea	Ahus Fished 1_3m	16.09	Stresstolerant	3.93
Australian	Papua New Guinea	Nusa	15.94	Stresstolerant	3.67
Australian	Papua New Guinea	Ahus Tambu 2_7m	15.71	Competitive	3.78
Australian	Papua New Guinea	Ahus Tambu 1_3m	14.95	Stresstolerant	3.78
Australian	Papua New Guinea	Mongol	13.87	Stresstolerant	3.67
Australian	Papua New Guinea	Ahus Fished 2_3m	12.75	Stresstolerant	3.93
Australian	Papua New Guinea	Ahus Tambu 2_3m	11.38	Competitive	3.78
Australian	Papua New Guinea	Ahus Tambu 1_7m	10.85	Stresstolerant	3.78
Australian	Solomon Islands	KOL06	36.93	Competitive	3.30
Australian	Solomon Islands	KOL07	29.20	Stresstolerant	3.30
Australian	Solomon Islands	KOL04	27.47	Stresstolerant	3.46
Australian	Solomon Islands	KOL18	26.33	Competitive	3.19
Australian	Solomon Islands	KOL09	24.67	Stresstolerant	3.39
Australian	Solomon Islands	KOL08	22.27	Stresstolerant	3.39
Australian	Solomon Islands	KOL05	19.67	Stresstolerant	3.46
Australian	Solomon Islands	KOL10	19.33	Stresstolerant	3.99
Australian	Solomon Islands	KOL20	15.27	Stresstolerant	3.19
Australian	Solomon Islands	KOL17	14.33	Stresstolerant	3.19
Australian	Solomon Islands	KOL01	14.27	Stresstolerant	3.37
Australian	Solomon Islands	KOL19	14.00	Stresstolerant	3.19
Australian	Solomon Islands	KOL03	12.67	Stresstolerant	3.64
Australian	Solomon Islands	KOL11	12.67	Stresstolerant	3.99
Australian	Solomon Islands	KOL16	12.00	Stresstolerant	3.84
Eastern Pacific	France, Clipperton Island	Clipperton.14_10m	49.37	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.4_20m	48.78	Stresstolerant	3.05

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Eastern Pacific	France, Clipperton Island	Clipperton.5_20m	40.69	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.9_20m	40.46	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.13_20m	37.75	Stresstolerant	3.05
Eastern Pacific	France, Clipperton Island	Clipperton.9_10m	36.80	Competitive	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.6_20m	33.69	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.7_10m	33.14	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.13_10m	29.90	Competitive	3.05
Eastern Pacific	France, Clipperton Island	Clipperton.10_10m	28.80	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.1_20m	28.53	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.10_20m	26.97	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.14_20m	26.88	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.3_10m	25.28	Stresstolerant	3.05
Eastern Pacific	France, Clipperton Island	Clipperton.6_10m	23.44	Competitive	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.12_10m	22.03	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.8_10m	21.67	Competitive	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.5_10m	20.66	Competitive	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.11_10m	19.66	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.4_10m	18.56	Competitive	3.05
Eastern Pacific	France, Clipperton Island	Clipperton.3_20m	17.31	Stresstolerant	3.05
Eastern Pacific	France, Clipperton Island	Clipperton.2_20m	15.91	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.2_10m	14.86	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.8_20m	14.49	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.11_20m	12.57	Stresstolerant	3.04
Eastern Pacific	France, Clipperton Island	Clipperton.12_20m	10.79	Stresstolerant	3.04
Fiji-Caroline Islands	Federated States of Micronesia	YAP-17	46.15	Stresstolerant	2.62
Fiji-Caroline Islands	Federated States of Micronesia	YAP-11	38.33	Stresstolerant	3.09

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Fiji-Caroline Islands	Federated States of Micronesia	YAP-2	36.56	Stresstolerant	2.62
Fiji-Caroline Islands	Federated States of Micronesia	YAP-3	35.02	Stresstolerant	2.76
Fiji-Caroline Islands	Federated States of Micronesia	YAP-20	34.67	Stresstolerant	3.09
Fiji-Caroline Islands	Federated States of Micronesia	YAP-1	29.91	Competitive	2.92
Fiji-Caroline Islands	Federated States of Micronesia	YAP-12	29.54	Stresstolerant	2.62
Fiji-Caroline Islands	Federated States of Micronesia	YAP-10	29.27	Stresstolerant	2.94
Fiji-Caroline Islands	Federated States of Micronesia	YAP-18	27.10	Stresstolerant	2.92
Fiji-Caroline Islands	Federated States of Micronesia	YAP-8	25.86	Stresstolerant	2.77
Fiji-Caroline Islands	Federated States of Micronesia	YAP-9	23.52	Stresstolerant	2.77
Fiji-Caroline Islands	Federated States of Micronesia	YAP-6	23.47	Stresstolerant	2.62
Fiji-Caroline Islands	Federated States of Micronesia	YAP-13	22.08	Stresstolerant	3.11
Fiji-Caroline Islands	Federated States of Micronesia	YAP-14	21.36	Stresstolerant	2.94
Fiji-Caroline Islands	Federated States of Micronesia	YAP-19	20.57	Stresstolerant	3.09
Fiji-Caroline Islands	Federated States of Micronesia	YAP-5	20.43	Stresstolerant	2.77
Fiji-Caroline Islands	Federated States of Micronesia	YAP-4	19.24	Stresstolerant	2.76
Fiji-Caroline Islands	Federated States of Micronesia	YAP-16	14.23	Stresstolerant	2.62
Fiji-Caroline Islands	Federated States of Micronesia	YAP-15	10.52	Stresstolerant	2.62
Fiji-Caroline Islands	Federated States of Micronesia	YAP-7	10.10	Stresstolerant	2.61
Fiji-Caroline Islands	Marshall Islands	Arn6n	73.13	Competitive	3.69
Fiji-Caroline Islands	Marshall Islands	Majuro_12a	65.38	Competitive	2.94
Fiji-Caroline Islands	Marshall Islands	Maj06	62.44	Competitive	3.22
Fiji-Caroline Islands	Marshall Islands	Majuro_13a	59.47	Competitive	3.22
Fiji-Caroline Islands	Marshall Islands	Majuro_12b	56.72	Competitive	2.94
Fiji-Caroline Islands	Marshall Islands	Majuro_13b	52.23	Stresstolerant	3.22
Fiji-Caroline Islands	Marshall Islands	Arn9n	48.43	Stresstolerant	3.67
Fiji-Caroline Islands	Marshall Islands	Majuro_6a	45.72	Competitive	3.24

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Fiji-Caroline Islands	Marshall Islands	Majuro_6b	42.74	Competitive	3.24
Fiji-Caroline Islands	Marshall Islands	Majuro_3a	41.48	Stresstolerant	2.94
Fiji-Caroline Islands	Marshall Islands	Majuro_5b	41.14	Competitive	3.24
Fiji-Caroline Islands	Marshall Islands	MAJ-13	36.94	Competitive	3.58
Fiji-Caroline Islands	Marshall Islands	Arn11n	35.29	Stresstolerant	3.34
Fiji-Caroline Islands	Marshall Islands	Maj09	33.84	Competitive	3.24
Fiji-Caroline Islands	Marshall Islands	Majuro_3b	33.31	Stresstolerant	2.94
Fiji-Caroline Islands	Marshall Islands	Majuro_10b	32.24	Stresstolerant	3.31
Fiji-Caroline Islands	Marshall Islands	Majuro_10a	32.00	Stresstolerant	3.31
Fiji-Caroline Islands	Marshall Islands	Majuro_7a	26.92	Competitive	2.96
Fiji-Caroline Islands	Marshall Islands	MAJ-8	26.30	Competitive	3.76
Fiji-Caroline Islands	Marshall Islands	Maj03	26.20	Competitive	3.24
Fiji-Caroline Islands	Marshall Islands	Majuro_9a	25.99	Competitive	3.56
Fiji-Caroline Islands	Marshall Islands	Majuro_2a	25.72	Competitive	3.76
Fiji-Caroline Islands	Marshall Islands	Arn13n	25.23	Competitive	3.47
Fiji-Caroline Islands	Marshall Islands	Majuro_7b	23.60	Stresstolerant	2.96
Fiji-Caroline Islands	Marshall Islands	Maj05	23.12	Competitive	3.31
Fiji-Caroline Islands	Marshall Islands	Arn1n	22.01	Stresstolerant	3.69
Fiji-Caroline Islands	Marshall Islands	Arn7n	21.87	Stresstolerant	3.69
Fiji-Caroline Islands	Marshall Islands	Majuro_5a	19.90	Competitive	3.24
Fiji-Caroline Islands	Marshall Islands	Maj01	19.76	Competitive	3.72
Fiji-Caroline Islands	Marshall Islands	MAJ-11	18.55	Competitive	3.72
Fiji-Caroline Islands	Marshall Islands	Arn8n	15.62	Competitive	3.84
Fiji-Caroline Islands	Marshall Islands	MAJ-9	12.97	Stresstolerant	3.31
Fiji-Caroline Islands	Marshall Islands	Majuro_2b	12.67	Competitive	3.76
Fiji-Caroline Islands	Marshall Islands	Majuro_8a	10.53	Stresstolerant	3.24

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Fiji-Caroline Islands	Marshall Islands	MAJ-7	10.43	Stresstolerant	3.08
Fiji-Caroline Islands	United States, Northern Mariana Islands	TIN-01	18.72	Stresstolerant	3.59
Fiji-Caroline Islands	United States, Northern Mariana Islands	GUA-07	16.43	Stresstolerant	3.52
Fiji-Caroline Islands	United States, Northern Mariana Islands	SAI-05	13.23	Stresstolerant	3.98
Fiji-Caroline Islands	United States, Northern Mariana Islands	AGU-02	12.45	Stresstolerant	3.87
Fiji-Caroline Islands	United States, Northern Mariana Islands	GUA-09	11.97	Stresstolerant	3.66
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-16	47.54	Stresstolerant	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-13	40.49	Competitive	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_North Barren	38.73	Competitive	2.18
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_RT6	36.77	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_RT10	34.29	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PAL-30-P-B	34.11	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-19	32.95	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-10	31.91	Stresstolerant	1.70
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_RT4	31.49	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_SIOFR3_10	30.13	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-11	29.66	Stresstolerant	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_RT13	29.11	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-23	29.03	Stresstolerant	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-17	28.11	Stresstolerant	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-26	27.75	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-04	27.74	Competitive	1.70
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_RT1_Western Terrace Snorkel Buoy	27.63	Competitive	2.32
Hawaii-Line	United States, Minor	PAL-09	27.45	Stresstolerant	2.32

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Islands	Outlying Islands				
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_RT7	26.94	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_RT25	26.85	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_Tortugonas	24.92	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_WTIP7_20	24.70	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_Penguin Spit Inner	23.19	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-10	22.62	Stresstolerant	2.18
Hawaii-Line Islands	United States, Minor Outlying Islands	PALF2_5	20.32	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-17	20.20	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_WTIP8_20	19.81	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_FR9_10	19.46	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_SIOFR3_20	18.29	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_DRT2	17.58	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-25	17.49	Stresstolerant	2.18
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_G-Banger	17.32	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_FR7_10	17.04	Stresstolerant	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PALF22_20	16.64	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_SIO_FR5	16.31	Competitive	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-21	16.27	Competitive	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	PALF25_10	16.13	Stresstolerant	2.18
Hawaii-Line Islands	United States, Minor Outlying Islands	PALF25_5	15.55	Competitive	2.18
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PALF22_10	15.15	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_Uvic_Holei&Bird_5	15.11	Stresstolerant	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-05	15.00	Stresstolerant	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PALFR9_20	14.72	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PALF14_5	14.57	Stresstolerant	2.17
Hawaii-Line	United States, Minor	PALF25_20	14.56	Stresstolerant	2.18

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Islands	Outlying Islands				
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_SIOFR5_10	14.12	Stresstolerant	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_Uvic_Paradise_10	14.00	Competitive	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-12	13.98	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PALF2_20	13.90	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_FR7_20	13.39	Stresstolerant	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-07	13.17	Stresstolerant	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-02	12.59	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-05	12.49	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-11	12.19	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PALF2_10	11.62	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PALF17_20	11.42	Stresstolerant	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_SIOFR5_20	11.00	Stresstolerant	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_ETIP1_20	10.85	Stresstolerant	2.18
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_RT23	10.65	Competitive	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PAL-21	10.62	Competitive	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_Uvic_Paradise_20	10.39	Stresstolerant	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_DRT1	10.27	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PALF17_5	10.24	Competitive	2.17
Hawaii-Line Islands	United States, Minor Outlying Islands	KIN-12	10.14	Stresstolerant	1.71
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PALF22_5	10.13	Stresstolerant	2.32
Hawaii-Line Islands	United States, Minor Outlying Islands	PANWR_PALF14_20	10.04	Stresstolerant	2.17
Indonesia	Indonesia	Bahoi_S	56.62	Competitive	0.00
Indonesia	Indonesia	Waybalun A	56.33	Competitive	3.06
Indonesia	Indonesia	Kinabuhutan_S	42.04	Competitive	0.99
Indonesia	Indonesia	Watowati A	39.83	Competitive	2.44
Indonesia	Indonesia	Pulau Mas A	39.50	Competitive	2.84
Indonesia	Indonesia	Kalinaun_S	34.18	Stresstolerant	0.15
Indonesia	Indonesia	Pele	33.56	Competitive	1.24
Indonesia	Indonesia	Desa Balaweling A	31.53	Stresstolerant	2.57
Indonesia	Indonesia	Maen_S	30.95	Competitive	0.15

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Indonesia	Indonesia	Eco Resort	29.88	Competitive	1.79
Indonesia	Indonesia	Maliambao_S	29.22	Competitive	0.14
Indonesia	Indonesia	Pele North	27.33	Competitive	1.27
Indonesia	Indonesia	Watowati B	27.27	Stresstolerant	2.44
Indonesia	Indonesia	Pulisan_S	27.19	Competitive	0.15
Indonesia	Indonesia	Mubune_S	25.94	Competitive	0.00
Indonesia	Indonesia	Hurung A	25.03	Competitive	2.78
Indonesia	Indonesia	Lihunu_S	24.98	Stresstolerant	0.59
Indonesia	Indonesia	WAAF	24.10	Competitive	1.13
Indonesia	Indonesia	Adonara A	21.53	Stresstolerant	3.72
Indonesia	Indonesia	Tambun_S	20.97	Competitive	0.99
Indonesia	Indonesia	Koten B	20.54	Stresstolerant	2.70
Indonesia	Indonesia	Munte_S	20.26	Competitive	0.00
Indonesia	Indonesia	Latto A	19.50	Stresstolerant	2.89
Indonesia	Indonesia	Aerbanua_S	19.48	Stresstolerant	1.68
Indonesia	Indonesia	Karang Le A	19.47	Competitive	3.21
Indonesia	Indonesia	Tanah Putih_S	18.48	Stresstolerant	0.14
Indonesia	Indonesia	4317	17.54	Stresstolerant	1.82
Indonesia	Indonesia	Karang Le B	17.24	Stresstolerant	3.21
Indonesia	Indonesia	Tarabitan_S	16.97	Stresstolerant	0.14
Indonesia	Indonesia	Batu Payung A	15.87	Stresstolerant	2.91
Indonesia	Indonesia	Koli Dateng A	15.87	Stresstolerant	2.36
Indonesia	Indonesia	Mausamang A	13.33	Stresstolerant	3.11
Indonesia	Indonesia	Mademang A	11.43	Stresstolerant	3.52
Indonesia	Indonesia	Waybalun B	11.36	Competitive	3.06
Indonesia	Indonesia	Talise_S	11.31	Stresstolerant	0.99
Indonesia	Indonesia	Mausamang B	10.52	Competitive	3.11
Indonesia	Indonesia	Koten A	10.50	Stresstolerant	2.70
Indonesia	Indonesia	Tanjung Ikara B	10.40	Stresstolerant	2.96
Indonesia	Malaysia	Paku Besar Island_6m	97.71	Competitive	1.97
Indonesia	Malaysia	Pinang Island_10m	95.72	Stresstolerant	1.61
Indonesia	Malaysia	Lima Island_6m	93.74	Competitive	1.97
Indonesia	Malaysia	Pinang Island_6m	88.65	Stresstolerant	1.61
Indonesia	Malaysia	Ekor Tebu Island_10m	85.72	Stresstolerant	1.94
Indonesia	Malaysia	Lima Island_10m	84.46	Stresstolerant	1.97
Indonesia	Malaysia	Paku Besar Island_10m	83.81	Competitive	1.97
Indonesia	Malaysia	Kerengga Besar Island_10m	76.81	Stresstolerant	1.94
Indonesia	Malaysia	Ekor Tebu Island_6m	73.77	Competitive	1.94
Indonesia	Malaysia	Kerengga Besar Island_6m	70.94	Stresstolerant	1.94
Indonesia	Malaysia	Pasir Cina_Left_3m	53.30	Stresstolerant	1.96
Indonesia	Malaysia	Pasir Cina_Right_3m	51.51	Competitive	1.96
Indonesia	Malaysia	Pasir Akar_10m	48.29	Competitive	1.61
Indonesia	Malaysia	Ekor Tebu_3m	47.41	Competitive	1.94
Indonesia	Malaysia	Chagar Hutang_Left_3m	42.97	Competitive	2.44
Indonesia	Malaysia	Pasir Akar_3m	39.83	Competitive	1.61
Indonesia	Malaysia	Chagar Hutang_Right_3m	38.08	Competitive	2.44
Indonesia	Malaysia	Pasir Cina_Left_10m	30.93	Competitive	1.96
Indonesia	Malaysia	Karah Island_10m	30.28	Competitive	1.96
Indonesia	Malaysia	Karah Island_3m	28.53	Competitive	1.96
Indonesia	Malaysia	Ekor Tebu_10m	26.43	Competitive	1.94
Indonesia	Malaysia	Lima Island_3m	25.91	Competitive	1.97

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
Indonesia	Malaysia	Pasir Cina_Right_10m	25.64	Stresstolerant	1.96
Indonesia	Malaysia	Teluk Dalam_3m	22.22	Stresstolerant	2.44
Indonesia	Malaysia	Teluk Dalam_10m	18.94	Stresstolerant	2.44
Indonesia	Singapore	Pulau Hantu	34.68	Stresstolerant	2.87
Indonesia	Singapore	Kusu	29.78	Stresstolerant	2.90
Indonesia	Singapore	Raffles	25.93	Stresstolerant	3.01
Indonesia	Singapore	TPT	22.10	Stresstolerant	2.99
Indonesia	Singapore	Kusu Island	16.90	Stresstolerant	2.90
Indonesia	Singapore	Pulau Hantu	14.88	Stresstolerant	2.99
Indonesia	Singapore	Sisters Island	14.09	Stresstolerant	2.90
Indonesia	Singapore	TPL	12.38	Stresstolerant	2.99
Indonesia	Singapore	Semakau	11.14	Stresstolerant	2.99
Japan-Vietnam	Taiwan	Houbihu	29.98	Stresstolerant	3.15
Japan-Vietnam	Taiwan	Outlet	24.23	Stresstolerant	3.15
Japan-Vietnam	Taiwan	Leidashih	15.45	Stresstolerant	3.15
Japan-Vietnam	Taiwan	Sangjiaowan	13.14	Stresstolerant	3.10
Japan-Vietnam	Taiwan	Jialeshuei	10.22	Stresstolerant	2.70
Japan-Vietnam	Taiwan	Tanzihwan	10.03	Stresstolerant	3.15
Persian Gulf	Oman	Coral Garden	31.97	Stresstolerant	0.38
Persian Gulf	Oman	Rashid West	11.00	Stresstolerant	1.06
Persian Gulf	United Arab Emirates	Saadiyat	27.06	Stresstolerant	0.76
Persian Gulf	United Arab Emirates	Ras Ghanadah	23.04	Stresstolerant	0.00
Persian Gulf	United Arab Emirates	Dhabiya West	14.79	Stresstolerant	0.46
Persian Gulf	United Arab Emirates	Dibba Rock	12.21	Competitive	0.91
Persian Gulf	United Arab Emirates	Dhabiya East	11.00	Stresstolerant	0.46
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU01_10m	51.84	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU09_20m	48.12	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU04_10m	47.71	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU08_20m	46.84	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU07_10m	46.03	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU08_10m	46.00	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU09_10m	40.48	Stresstolerant	0.44
Polynesia	British Overseas	Ducie.DU07_20m	36.80	Competitive	0.44

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
	Territory, Pitcairn Islands				
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE13_10m	32.62	Stresstolerant	2.03
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU04_20m	30.19	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE12_10m	27.47	Stresstolerant	0.95
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU06_10m	26.80	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU03_20m	26.00	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE13_20m	25.86	Stresstolerant	2.03
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU03_10m	24.40	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU06_20m	23.32	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE11_20m	22.23	Competitive	1.54
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE11_10m	21.09	Stresstolerant	1.54
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE01_20m	16.83	Competitive	0.95
Polynesia	British Overseas Territory, Pitcairn Islands	Pitcairn.PI14_30m	15.97	Stresstolerant	1.95
Polynesia	British Overseas Territory, Pitcairn Islands	Pitcairn.PI08_20m	15.63	Competitive	1.95
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU05_20m	15.00	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE07_10m	12.99	Stresstolerant	0.95
Polynesia	British Overseas Territory, Pitcairn Islands	Pitcairn.PI13_30m	12.96	Competitive	1.95
Polynesia	British Overseas Territory, Pitcairn	Henderson.HE10_10m	12.92	Competitive	1.54

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
	Islands				
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU01_20m	12.72	Competitive	0.44
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE10_20m	10.75	Competitive	1.54
Polynesia	British Overseas Territory, Pitcairn Islands	Henderson.HE06_20m	10.37	Competitive	1.56
Polynesia	British Overseas Territory, Pitcairn Islands	Ducie.DU11_10m	10.20	Stresstolerant	0.44
Polynesia	France, French Polynesia	nengo	18.96	Competitive	3.02
Red Sea	Saudi Arabia	Horseshoe_10m	20.84	Stresstolerant	3.38
Red Sea	Saudi Arabia	Abu Madafi_10m	20.17	Stresstolerant	1.73
Red Sea	Saudi Arabia	Palace Reef_1m	19.62	Competitive	3.94
Red Sea	Saudi Arabia	Shi'b D'auqa_10m	18.46	Stresstolerant	2.56
Red Sea	Saudi Arabia	Shib Nazar_10m	18.44	Stresstolerant	2.19
Red Sea	Saudi Arabia	Shi'b D'auqa_2m	18.16	Competitive	2.56
Red Sea	Saudi Arabia	Abu Madafi_1m	18.07	Competitive	1.73
Red Sea	Saudi Arabia	Horseshoe_1m	17.74	Competitive	3.38
Red Sea	Saudi Arabia	Palace Reef_10m	17.31	Stresstolerant	3.94
Red Sea	Saudi Arabia	Abu Roma_10m	16.43	Competitive	3.31
Red Sea	Saudi Arabia	Abu Roma_1m	14.26	Competitive	3.31
Unclustered	Myanmar	136	77.18	Competitive	1.59
Unclustered	Myanmar	11	65.07	Competitive	1.59
Unclustered	Myanmar	149	55.32	Competitive	1.59
Unclustered	Myanmar	9	54.81	Competitive	1.59
Unclustered	Myanmar	10	46.90	Competitive	1.59
Unclustered	Myanmar	21	44.33	Stresstolerant	2.24
Unclustered	Myanmar	12	36.56	Competitive	1.59
Unclustered	Myanmar	143	36.16	Stresstolerant	2.30
Unclustered	Myanmar	18	33.66	Stresstolerant	2.17
Unclustered	Myanmar	6	31.44	Stresstolerant	2.50
Unclustered	Myanmar	7	29.22	Stresstolerant	3.61
Unclustered	Myanmar	28	27.71	Stresstolerant	3.44
Unclustered	Myanmar	144	25.76	Stresstolerant	2.19
Unclustered	Myanmar	130	24.74	Stresstolerant	2.30
Unclustered	Myanmar	16	21.39	Stresstolerant	2.17
Unclustered	Myanmar	148	21.34	Stresstolerant	1.59
Unclustered	Myanmar	17	20.60	Stresstolerant	2.32
Unclustered	Myanmar	129	18.54	Stresstolerant	2.30
Unclustered	Myanmar	127	18.10	Competitive	2.76
Unclustered	Myanmar	150	17.22	Stresstolerant	3.63
Unclustered	Myanmar	137	11.67	Stresstolerant	3.02
Unclustered	Myanmar	13	11.13	Stresstolerant	3.02
Unclustered	Thailand	Ko Khrok (West)	34.31	Stresstolerant	3.55
Unclustered	Thailand	Ko Yak (South)	23.33	Stresstolerant	3.91
Unclustered	Thailand	Ko thong Lang (West)	22.36	Stresstolerant	3.91
Unclustered	Thailand	South of Ko Lan (Ao	21.94	Stresstolerant	3.46

Province	Nation	Site	% Cover of competitive and stress-tolerant corals	Dominant life history	Maximum DHW, 2014-2017
		Nuan)			
Unclustered	Thailand	Ko Thain (West)	21.05	Stresstolerant	3.91
Unclustered	Thailand	Ko Sak (Northwest)	16.58	Stresstolerant	3.55

Supplementary Table 7. Variance inflation factor (VIF) scores for continuous covariates.

Covariate	Starting VIF	Ending VIF
Local population growth, 2000-2010	1.40	1.24
Gravity – nearest settlement	1.15	1.06
Gravity - market	1.35	1.25
Cultivated land, % change 2002-2012	1.37	1.34
Cultivated land, % 2012	1.32	1.12
GDP per capita	7.15	X
Voice and accountability	2.72	X
HDI	5.75	1.54
Past maximum DHW	1.36	1.25
Years since Maximum DHW	1.39	1.32
Primary productivity	1.96	1.52
Depth	1.41	1.37
Wave exposure	1.83	1.79
Maximum cyclone days	2.10	1.19
Years since max cyclone	2.59	X
Reef area, km^2	1.72	1.44

Supplementary Table 8. Data sources, countries and contact information for the data contributed to this study. Sources are ordered by the number of sites contributed to this survey.

Source	Countries	Sites	Name	Contact
National Geographic Pristine Seas	Chile, France, Mexico, Mozambique, Niue, United Kingdom	431	Alan Friedlander	friedlan@hawaii.edu
NOAA Coral Reef Ecosystem Pacific	Samoa, United States	328	Bernardo Vargas-Angel	bernardo.vargasangel@noaa.gov
Jupiter	Fiji, Solomon Islands	276	Stacy Jupiter	sjupiter@wcs.org
Lamb	Australia, Indonesia, Myanmar, Thailand	179	Joleah Lamb	joleah.lamb@uci.edu
Graham	Australia, Maldives, Seychelles, Chagos	159	Nick Graham	nick.graham@jcu.edu.au
WCS Indonesia	Indonesia	152	Shinta Pardede	spardede@wcs.org
Houk	Marshall Islands, Micronesia, United States	97	Peter Houk	peterhouk@gmail.com
Western Australia Department of Parks and Wildlife	Australia	91	Shaun Wilson	shaun.wilson@dbca.wa.gov.au
Bridge	Australia, Maldives	78	Tom Bridge	thomas.bridge@jcu.edu.au
Richards	Australia, Marshall Islands, Micronesia	76	Zoe Richards	Zoe.Richards@curtin.edu.au
Franklin	United States	61	Erik Franklin	erik.franklin@hawaii.edu
Donner	Kiribati, Marshall Islands	54	Simon Donner	simon.donner@ubc.ca
WWF-US and WWF-Indonesia	Indonesia	54	Estradiveri	estradivari@wwf.id
Williams	United States	51	Gareth Williams	g.j.williams@bangor.ac.uk
WCS Madagascar	Madagascar	49	Ravaka Ranaivoson	rranaivoson@wcs.org
WCS Kenya	Kenya, Tanzania	48	Tim McClanahan	tmcclanahan@wcs.org
Pratchett	Australia	45	Morgan Pratchett	morgan.pratchett@jcu.edu.au
Bauman	Malaysia, Oman, Papua New Guinea, United Arab Emirates	42	Andrew Bauman	andrew.bauman@my.jcu.edu.au
Hobbs	Australia	37	JP Hobbs	jp.hobbs2@gmail.com
Australian Institute of Marine Science	Australia	30	James Gilmour	j.gilmour@aims.gov.au
Bouwmeester	Saudi Arabia	30	Jessica Bouwmeester	jessica@qu.edu.qa
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Baird	Japan	12	Andrew Baird	andrew.baird@jcu.edu.au
Patankar	India	10	Vardhan Patankar	vardhanpatankar@gmail.com
Adjeroud	France	8	Mehdi Adjeroud	mehdi.adjeroud@ird.fr
Januchowski-Hartley	Papua New Guinea, Vanuatu	8	Fraser Januchowski-Hartley	f.a.hartley@gmail.com
Penin	France	6	Lucie Penin	lucie.penin@univ-reunion.fr
Lee	Singapore	2	A.C. Lee	tmsleeac@nus.edu.sg