**Tabel S1.** The category and of major (course functional group) and finer-scale benthic groups that are used for the analysis.

|  |  |
| --- | --- |
| **Major benthic group**  | **Finer-scale benthic group**  |
|  Hard Coral  | Branching *Acropora* (AC\_Br) |
|  | Digitate *Acropora* (AC\_Di) |
|  | Encrusting *Acropora* (AC\_En) |
|  | Submassive *Acropora* (AC\_Sm) |
|  | Tabulate *Acropora* (AC\_Tb) |
|  | Branching coral (CO\_Br) |
|  | Encrusting coral (CO\_Fo) |
|  | Foliose coral (CO\_En) |
|  | Massive coral (CO\_Ma) |
|  | Submassive coral (CO\_Sm) |
|  | Mushroom coral (CO\_Mu) |
|  | *Millepora* (CO\_Me) |
|  | *Tubipora* (CO\_Tu)*Heliopora* (CO\_Hl) |
| Soft Coral  | Gorgonian (SC\_Go) |
|  | Xenia (SC\_Xe) |
|  | Other softcoral (SC\_OT)  |
| Crustose Coralline Algae (CCA) | Crustose Coralline Algae (CCA) |
| Turfalgae  | Turfalgae (AL\_TA) |
|  | Dead coral algae (AL\_DC) |
| Sponge  | Ball sponge (SP\_Ba) |
|  | Branching sponge (SP\_Br) |
|  | Digitate sponge (SP\_Di) |
|  | Encrusting sponge (SP\_En) |
|  | Excavating sponge (SP\_Ex) |
|  | Massive sponge (SP\_Ma) |
|  | Tube Sponge (SP\_Tu) |
|  | Other sponge (SP\_OT) |
| Macroalgae  | *Caulerpa* (MA\_Ca) |
|  | *Cladophora* (MA\_Cl) |
|  | *Halimeda* (MA\_Ha) |
|  | *Padina* (MA\_Pa)  |
|  | *Sargassum* (MA\_Sa) |
|  | Other macroalgae (MA\_OT)  |
| Benthic Cyanobacterial Mats (BCMs) | *Lyngbya* (CY\_Ly) |
|  | Red-brown mats (CY\_RB) |
|  | Other BCM (CY\_OT) |
| Bivalvia | Clam (BI\_Cl) |
|  | Cockle (BI\_Co) |
|  | Mussel (BI\_Mu) |
|  | Oyster (BI\_Oy) |
| Other invertebrates | Gastropoda Cerithidae (GA\_Ce) |
|  | Gastropoda Muricidae (GA\_Mr) |
|  | Gastropoda Neritidae (GA\_Ne) |
|  | Gastropoda Potamididae (GA\_Po) |
|  | Gastropoda Trochidae (GA\_Tr) |
|  | Gastropoda other (GA\_OT) |
|  | Ascidian colonial (OT\_AC) |
|  | Ascidian solitary (OT\_AS) |
|  | Echinoderm Asteroidea (OT\_EA) |
|  | Echinoderm Crinoidea (OT\_EC) |
|  | Echinoderm Echinoidea (OT\_EE) |
|  | Echinoderm Holothuroidea (OT\_EH) |
|  | Echinoderm Ophiuroidea (OT\_EO) |
|  | Hydrozoa (OT\_HY) |
|  | Polychaeta (OT\_PO) |
|  | Zoanthid (OT\_ZO) |
|  | Other biota (OT) |
| Substrates  | Branch / Small-wood (SU\_Br) |
|  | Dead shell (SU\_Ds) |
|  | Leaf / Litter (SU\_Le) |
|  | Mangrove root (SU\_Mr) |
|  | Mud / Silt (SU\_Mu) |
|  | Rubble (SU\_Ru) |
|  | Rock (SU\_Ro) |
|  | Sand (SU\_Sa) |

Note: *Millepora, Tubipora* and *Heliopora* are classified into Hard Coral because they are calcareous reef framework builders.