# S2 Table. Functional groups used in the Guam Atlantis coral reef ecosystem model.

Groups with an \* are exploited in the recreational shore-based fishery.

| **#** | **Code** | **Group** | **Common name** | **Family** | **Scientific name** | **Biomass (t/km2)** | | **% of total group** | | **cummula-tive sum** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **FISH** |  |  |  |  | *(wet weight) Italics is tow data; Bold is total per group* | |
| **1** | **FPL** | **Planktivores** | | |  | **2.31** |  | |  | |
|  |  |  | Ocellate damselfish | Pomacentridae | *Pomacentrus vaiuli* | 0.33 | 14.4 | | 0.14 | |
|  |  |  | Shoulderbar soldierfish | Holocentridae | *Myripristis kuntee* | 0.32 | 13.9 | | 0.28 | |
|  |  |  | Whitespotted devil | Pomacentridae | *Plectroglyphidodon lacrymatus* | 0.18 | 7.8 | | 0.36 | |
|  |  |  | Redtoothed triggerfish | Balistidae | *Odonus niger* | 0.10 | 6.9 | | 0.43 | |
|  |  |  | Guam damsel | Pomacentridae | *Pomachromis guamensis* | 0.16 | 6.8 | | 0.50 | |
|  |  |  | Midnight snapper | Lutjanidae | *Macolor macularis* | 0.15 | 6.4 | | 0.56 | |
|  |  |  | Black and white snapper | Lutjanidae | *Macolor niger* | 0.09 | 3.8 | | 0.60 | |
|  |  |  | Blenny species | Blenniidae | *Blenniidae* | 0.07 | 2.9 | | 0.63 | |
|  |  |  | Blotcheye soldierfish | Holocentridae | *Myripristis berndti* | 0.06 | 2.6 | | 0.66 | |
|  |  |  | Chinese zebra goby | Microdesmidae | *Ptereleotris zebra* | 0.05 | 2.1 | | 0.68 | |
|  |  |  | Sleek unicornfish | Acanthuridae | *Naso hexacanthus* | 0.05 | 2.0 | | 0.70 | |
|  |  |  | Reticulate dascyllus | Pomacentridae | *Dascyllus reticulatus* | 0.05 | 2.0 | | 0.72 | |
|  |  |  | Midget chromis | Pomacentridae | *Chromis acares* | 0.04 | 1.9 | | 0.73 | |
|  |  |  | Red shoulder wrasse | Labridae | *Stethojulis bandanensis* | 0.04 | 1.8 | | 0.75 | |
| **2** | **FCO** | **Coralivores** | |  |  | **0.29** |  | |  | |
|  |  |  | Mailed butterflyfish | Chaetodontidae | *Chaetodon reticulatus* | 0.07 | 25.8 | | 0.26 | |
|  |  |  | Speckled butterflyfish | Chaetodontidae | *Chaetodon citrinellus* | 0.06 | 19.1 | | 0.45 | |
|  |  |  | Threeband pennantfish | Chaetodontidae | *Heniochus chrysostomus* | 0.03 | 10.0 | | 0.55 | |
|  |  |  | Johnston Island damsel | Pomacentridae | *Plectroglyphidodon johnstonianus* | 0.03 | 10.3 | | 0.66 | |
|  |  |  | Oval butterflyfish | Chaetodontidae | *Chaetodon lunulatus* | 0.03 | 9.7 | | 0.75 | |
| **3** | **FIV** | **Invertivores** | | | | **1.748** |  | |  | |
|  |  |  | Orange-lined triggerfish | Balistidae | *Balistapus undulatus* | 0.23 | 13.3 | | 0.13 | |
|  |  |  | Blackbar devil | Pomacentridae | *Plectroglyphidodon dickii* | 0.23 | 12.9 | | 0.26 | |
|  |  |  | Arc-eye hawkfish | Cirrhitidae | *Paracirrhites arcatus* | 0.19 | 10.6 | | 0.37 | |
|  |  |  | Halfmoon triggerfish | Balistidae | *Sufflamen chrysopterum* | 0.14 | 7.9 | | 0.44 | |
|  |  |  | Boomerang triggerfish | Balistidae | *Sufflamen bursa* | 0.13 | 6.7 | | 0.51 | |
|  |  |  | Blueband goby | Gobiidae | *Valenciennea strigata* | 0.07 | 4.3 | | 0.55 | |
|  |  |  | Red-lined wrasse | Labridae | *Halichoeres biocellatus* | 0.07 | 4.2 | | 0.60 | |
|  |  |  | Moorish idol | Zanclidae | *Zanclus cornutus* | 0.06 | 3.8 | | 0.63 | |
|  |  |  | Royal angelfish | Pomacanthidae | *Pygoplites diacanthus* | 0.06 | 3.6 | | 0.67 | |
|  |  |  | Raccoon butterflyfish | Chaetodontidae | *Chaetodon lunula* | 0.06 | 3.4 | | 0.70 | |
|  |  |  | Latticed sandperch | Pinguipedidae | *Parapercis clathrata* | 0.04 | 2.1 | | 0.73 | |
|  |  |  | Titan triggerfish | Balistidae | *Balistoides viridescens* | 0.04 | 2.1 | | 0.75 | |
| **4** | **TIV** | **Target Invertivores\*** | | | | **2.213** |  | |  | |
|  |  |  | Humpnose big-eye bream | Lethrinidae | *Monotaxis grandoculis* | 0.50 | 22.7 | | 0.23 | |
|  |  |  | Fivestripe wrasse | Labridae | *Thalassoma quinquevittatum* | 0.41 | 18.4 | | 0.41 | |
|  |  |  | Manybar goatfish | Mullidae | *Parupeneus multifasciatus* | 0.16 | 7.3 | | 0.48 | |
|  |  |  | Striped large-eye bream | Lethrinidae | *Gnathodentex aureolineatus* | 0.10 | 4.6 | | 0.53 | |
|  |  |  | Silverspot squirrelfish | Holocentridae | *Sargocentron caudimaculatum* | 0.08 | 3.8 | | 0.57 | |
|  |  |  | Common bluestripe snapper | Lutjanidae | *Lutjanus kasmira* | 0.06 | 3.0 | | 0.60 | |
|  |  |  | Checkerboard wrasse | Labridae | *Halichoeres hortulanus* | 0.07 | 3.0 | | 0.63 | |
|  |  |  | wrasse | Labridae | *Cheilinus sp* | 0.06 | 2.5 | | 0.65 | |
|  |  |  | Blacktail snapper | Lutjanidae | *Lutjanus fulvus* | 0.06 | 2.5 | | 0.68 | |
|  |  |  | Blue lined squirrelfish | Holocentridae | *Sargocentron tiere* | 0.05 | 2.4 | | 0.70 | |
|  |  |  | Tripletail wrasse | Labridae | *Cheilinus trilobatus* | 0.05 | 2.2 | | 0.72 | |
|  |  |  | Pastel ringwrasse | Labridae | *Hologymnosus doliatus* | 0.05 | 2.1 | | 0.74 | |
|  |  |  | Sammara squirrelfish | Holocentridae | *Neoniphon sammara* | 0.05 | 2.1 | | 0.77 | |
| **5** | **HHW** | **Humphead wrasse\*** | |  |  | **0.017** |  | |  | |
|  |  |  | Humphead/Napolean wrasse | Labridae | *Cheilinus undulatus* | 0.02 | 1 | | 1 | |
| **6** | **FDE** | **Detritivores** | | | | **1.42** |  | |  | |
|  |  |  | Striated surgeonfish | Acanthuridae | *Ctenochaetus striatus* | 1.34 | 93.9 | | 0.94 | |
| **7** | **FHB** | **Browsers** | |  |  | **0.06** |  | |  | |
|  |  |  | Carolines parrotfish | Scaridae | *Calotomus carolinus* | 0.05 | 94.8 | | 0.95 | |
| **8** | **THB** | **Target Browsers\*** | | |  | **0.89** |  | |  | |
|  |  |  | Orangespine unicornfish | Acanthuridae | *Naso lituratus* | 0.58 | 65.6 | | 0.66 | |
|  |  |  | Bulbnose unicornfish | Acanthuridae | *Naso tonganus* | 0.07 | 7.9 | | 0.73 | |
|  |  |  | Chubs | Kyphosidae | *Kyphosus sp* | 0.05 | 5.6 | | 0.79 | |
| **9** | **FHG** | **Grazers** | | |  | **1.26** |  | |  | |
|  |  |  | Pinktail triggerfish | Balistidae | *Melichthys vidua* | 0.51 | 40.4 | | 0.40 | |
|  |  |  | Pacific gregory | Pomacentridae | *Stegastes fasciolatus* | 0.30 | 23.5 | | 0.64 | |
|  |  |  | Surge damselfish | Pomacentridae | *Chrysiptera brownriggii* | 0.22 | 17.1 | | 0.81 | |
| **10** | **THG** | **Target Grazers\*** | |  |  | **2.33** |  | |  | |
|  |  |  | Brown surgeonfish | Acanthuridae | *Acanthurus nigrofuscus* | 0.96 | 41.0 | | 0.41 | |
|  |  |  | Lined surgeonfish | Acanthuridae | *Acanthurus lineatus* | 0.74 | 31.6 | | 0.73 | |
|  |  |  | Whitecheek surgeonfish | Acanthuridae | *Acanthurus nigricans* | 0.23 | 9.7 | | 0.82 | |
|  |  |  | |  |  |  |  | |  | |
| **11** | **FHS** | **Scrapers\*** | |  |  | **3.66** |  | |  | |
|  |  |  | Daisy parrotfish | Scaridae | *Chlorurus sordidus* | 2.29 | 62.5 | | 0.62 | |
|  |  |  | Common parrotfish | Scaridae | *Scarus psittacus* | 0.61 | 16.6 | | 0.79 | |
| **12** | **FHE** | **Excavators\*** | |  |  | **0.62** |  | |  | |
|  |  |  | Tan-faced parrotfish | Scaridae | *Chlorurus frontalis* | 0.26 | 42.4 | | 0.42 | |
|  |  |  | Filament-finned parrotfish | Scaridae | *Scarus altipinnis* | 0.24 | 38.7 | | 0.81 | |
|  |  |  | Ember parrotfish | Scaridae | *Scarus rubroviolaceus* | 0.12 | 18.9 | | 1 | |
| **13** | **BHP** | **Bumphead parrotfish\*** (none seen during visual surveys, biomass assumed) | | | | **0.01** |  | |  | |
|  |  |  | Humphead parrotfish | Scaridae | *Bolbometopon muricatum* | 0.01 | 1 | | 1 | |
| **14** | **FPB** | **Benthic piscivores** | | |  | **0.14** |  | |  | |
|  |  |  | Blackside hawkfish | Cirrhitidae | *Paracirrhites forsteri* | 0.06 | 44.4 | | 0.44 | |
|  |  |  | Whitespot hawkfish | Cirrhitidae | *Paracirrhites hemistictus* | 0.03 | 25.1 | | 0.70 | |
|  |  |  | Giant moray | Muraenidae | *Gymnothorax javanicus* | 0.02 | 11.8 | | 0.81 | |
| **15** | **TPB** | **Target benthic piscivores\*** | | | | **1.09** |  | |  | |
|  |  |  | Darkfin hind | Serranidae | *Cephalopholis urodeta* | 0.30 | 27.4 | | 0.27 | |
|  |  |  | Ringtail maori wrasse | Labridae | *Oxycheilinus unifasciatus* | 0.23 | 21.1 | | 0.49 | |
|  |  |  | Peacock hind | Serranidae | *Cephalopholis argus* | 0.16 | 14.4 | | 0.63 | |
|  |  |  | Blacktip grouper | Serranidae | *Epinephelus fasciatus* | 0.11 | 10.3 | | 0.73 | |
|  |  |  | Two-spot red snapper | Lutjanidae | *Lutjanus bohar* | 0.10 | 9.2 | | 0.82 | |
| **16** | **FPM** | **Mid-water piscivores\*** | | | | **0.46** |  | |  | |
|  |  |  | Small toothed jobfish | Lutjanidae | *Aphareus furca* | 0.45 | 99.3 | | 0.99 | |
| **17** | **FPR** | **Roving piscivores\*** | |  |  | ***1.09*** |  | |  | |
|  |  |  | Blackfin barracuda | Sphyraenidae | *Sphyraena qenie* | *0.60* | 55.1 | | 0.55 | |
|  |  |  | Jacks | Carangidae | *Caranx sp* | *0.40* | 36.7 | | 0.92 | |
|  | **SHARKS** |  |  |  |  |  |  | |  | |
| **18** | **SHR** | **Reef-associated sharks\*** | |  |  | ***0.15*** |  | |  | |
|  |  |  | Tawny nurse shark | Carcharhinidae | *Nebrius ferrugineus* | *0.09* | 58.0 | | 0.58 | |
|  |  |  | Whitetip reef shark | Carcharhinidae | *Triaenodon obesus* | *0.04* | 26.0 | | 0.84 | |
| **19** | **RAY** | **Rays\*** |  |  |  | ***0.13*** |  | |  | |
|  |  |  | Spotted Eagle ray | Myliobatidae | *Aetobatus narinari* | *0.08* | 66.3 | | 0.66 | |
|  |  |  | Porcupine ray | Dasyatidae | *Urogymnus asperrimus* | *0.04* | 33.7 | | 1 | |
|  | **REPTILES** | |  |  |  |  |  | |  | |
| **20** | **REP** | **Sea Turtles** | | | | **0.80** |  | |  | |
|  |  |  | Green turtle | Chelonidae | *Chelonia mydas* | 0.80 | 1 | | 1 | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Code** | **Group** | **species** | | | | **Biomass** | | **Source biomass data** | | |
| **INVERTEBRATES** |  |  | | | |  | | |  |
| BC | Benthic Carnivores\* | carnivorous gastropods, crusteaceans and polycheates | | | | 20.13 | | | CRED, UoG, CMP |
| BD | Benthic Detritivores\* | sea cucumbers, lobster, polycheates, detritivorous gastropods and crusteaceans (e.g. crabs) | | | | 17.10 | | | CRED, UoG, CMP |
| BM | Benthic Meiofauna | infauna: small herbivorous polychaetes, gastropods and crustaceans | | | | 10.97 | | | CRED, UoG, CMP |
| BFF | Benthic Suspension Feeders\* | octocoral, sponges, tunicates, zooanthids, giant clams, bivalves, polychaetes, foraminifera, bryzoans, brittle stars | | | | 216.53 | | | CRED, UoG, CMP |
| CRS | Sheltering corals | branching/tabular morphology | | | | 30.73 | | | CRED, UoG, CMP |
| CRN | Non-sheltering corals | massive/encrusting morphology | | | | 108.92 | | | CRED, UoG, CMP |
| CEP | Cephalopods\* | octopus, squids | | | | 1.00 | | | CRED, UoG, CMP |
| BG | Benthic Grazers\* | urchins (helmet, collectors, pencil, boring, diadema) | | | | 0.16 | | | CRED, UoG, CMP |
| BSS | Sea Stars | including crown-of-thorns seastar | | | | 0.21 | | | CRED, UoG, CMP |
| **ALGAE** |  |  |  |  |
| TRF | Turf algae | < 1cm | | | | 199.13 | | | CRED |
| MA | Macroalgae\* | > 1cm | | | | 188.65 | | | CRED |
| CCA | Crustose-coraline algae |  | | | | 102.53 | | | CRED |
| **PLANKTON** | |  | | | |  |  | |
| PS | Small phytoplankton | picoeukaryotes, cyanobacteria, < 1um | | | | 0.16 | | | CRED, ([Wang et al., 2008](#_ENREF_6)) |
| PL | Large phytoplankton | incl. diatoms | | | |  | | | CRED, ([Wang et al., 2008](#_ENREF_6)) |
| ZC | Zooplankton -carnivores | chaetognath, amphipods, crab larvae, isopods, mysid shrimps, polychaetes (micronekton) | | | | 0.8 | | | ([Hamner et al., 2007](#_ENREF_4); [Suntsov and Domokos, 2013](#_ENREF_5)) |
| ZD | Demersal zooplankton | pelagic fish & invert larvae, copepods, polychaetes, foraminiferas | | | | 1.5 | | | ([Alldredge and King, 2009](#_ENREF_2)), 15 times oceanic zooplankton ([Alldredge and King, 1977](#_ENREF_1)) density varies with live coral ([Grimm and Clayshulte, 1981](#_ENREF_3)) |
| ZH | Zooplankton - herbivores | copepods, mesonekton | | | | 0.36 | | | ([Suntsov and Domokos, 2013](#_ENREF_5))([Hamner et al., 2007](#_ENREF_4)) |
| **BACTERIA** | |  | | | |  |  | |
| PB | Pelagic Bacteria | hetrotrophic bacteria (0.2-1 um) | | | |  | | | CRED |
| BB | Benthic bacteria | hetrotrophic bacteria (0.2-1 um) | | | |  | | |  |
| **DETRITUS** | |  | | | |  |  | |
| DC | carrion | dead | | | | 0 | | |  |
| DR | refractory detritus | long 'life' time | | | |  | | | EPA |
| DL | Labile detritus | easily degraded | | | |  | | | EPA |

**References for Appendix 3**

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