

BIOREGIONS OF THE GREAT BARRIER REEF WORLD HERITAGE AREA

The Great Barrier Reef Marine Park Authority, through the classification phase of the Representative Areas Program, has mapped the biological and physical diversity of the Great Barrier Reef World Heritage Area. The bioregion maps were developed by panels of experts, using the best available information at the time - more than 40 layers of data compiled through years of research. Each bioregion represents an area where the known animal and plant assemblages, and the physical features, are sufficiently distinct from the surroundings and the rest of the Great Barrier Reef World Heritage Area.

Glossary of terms

assemblages – groups of plants and animals

benthos – animals and plants living on and below the surface of the sea floor

biomass – the weight of all the plants and animals (in an area)

bioregion – an area where the groups of animals and plants, and the physical features are sufficiently distinct from the surroundings (at the scale of hundreds of kilometres)

biota – plants and animals of a region

bivalve – animal (mollusc) with two plates (valves) to its shell

carbonate – white chalky mineral formed from fragments of animal skeletons (e.g. coral, shells) and some seaweeds

Caulerpa – a group of green marine fleshy seaweed

communities – groups of different plants and animals which live together in an area

distinct (biologically distinct) - differences in absolute &/or relative abundance of seagrasses, &/or sponges, &/or general epibenthos &/or pelagic fish.

diversity – variety in the number of plant and animal types in an area

epibenthos – animals and plants living on the sea floor at depths between the low water mark and the 200-metre line

episodic – occurring irregularly

filter feeder – animal which feeds on small animals or plants, by straining them out of the surrounding water (e.g. mussel, sponge)

foraminifera – tiny oceanic animal with a chalky shell which contributes to reef building

fuzzy boundary (of bioregion) – unclear boundary between one bioregion and the next, due to gradual change in nature or limited information

geomorphology – physical features of the earth's surface

gorgonian – sea fans, sea whips and other horny corals

habitat – place in which an animal or plant lives

Halimeda – tropical seaweed made up of chains of chalky segments – important reef builder that grows in dense gardens

Hydroids – small colonial animals forming tuft-like growths on seaweeds etc.

incipient – beginning, in an initial stage

octocorals – group of corals with eight tentacles (includes soft corals and gorgonians)

pelagic – living in the open sea or near the surface of the open sea

sediment – material that settles to the seafloor (e.g. mud, sand, broken shell etc.)

solitary corals – free-living corals, generally a single large animal (polyp)

species – group of interbreeding animals or plants

terrestrial – referring to land

terrigenous – derived from the land via rivers or beaches (e.g. terrigenous deposits)

turbidity – cloudy, muddy water

water column productivity – amount of microscopic plants and animals in the water at a particular location

Reef bioregions of the Great Barrier Reef World Heritage Area
<p>RA1 Deltaic Reefs Distinct geomorphology, coral and fish. Torres Strait influences (strong currents). Less exposed to Coral Sea than RA2 due to widening of continental shelf.</p>
<p>RA2 Outer Barrier Reefs Distinct geomorphology, coral and fish. Coral Sea influence. Mosaic of steep, exposed high-energy fronts and current-swept channels. Leeward reef benthos has a mix of clear-water and coastal species.</p>
<p>RA3 Outer Shelf Reefs Distinct geomorphology, with more submerged reefs than elsewhere. Transition zone. Open matrix of reefs allows greater Coral Sea influence, little coastal influence.</p>
<p>RA4 Strong Tidal Outer Shelf Reefs Continental shelf protrudes widely but slopes gently. Small outer reefs set back from the edge. Strong tidal movement, high-energy area, biologically distinct.</p>
<p>RB1 Far Northern Outer Mid Shelf Reefs Distinct biologically from true outer-shelf or mid-shelf reefs. Species-rich benthos. Mostly smaller reefs, dominated by shoals.</p>
<p>RC1 Torres Strait influenced Mid Shelf Reefs Reefs small, and have Torres Strait influence. Biologically distinct from RC2.</p>
<p>RC2 Far Northern Protected Mid Shelf Reefs and Shoals RC2 & RD have highest species diversity of octocorals on the GBR. Rich hard coral communities. Larger shoals and reefs than RC1. Extensive reef flats and shoal terraces, separated by diverse channel system (some calm and sheltered, others with strong flow). Many turtle sightings.</p>
<p>RD Far Northern Open Lagoon Reefs RC2 & RD have highest species diversity of octocorals on the GBR. Small islands and low vegetated isles with fringing reefs as well as near-shore platform reefs. Distinct and species rich coral communities. Species rich algal communities. Less fish diversity than RC2. Many turtle sightings.</p>
<p>RE1 Coastal Far Northern Reefs Relatively rich in both hard and octocoral species. Sediment resuspension during south-east trade winds. Biologically distinct patches of reef.</p>
<p>RE2 Coastal Northern Reefs Higher species richness, and more <i>Sargassum</i> than in RE3. Low soft coral cover, but higher richness than RE3. Silty in sheltered areas. Sediment resuspension during south-east trade winds. Biologically distinct patches of reef.</p>
<p>RE3 Coastal Central Reefs Biologically distinct, patchy reefs; more exposed to prevailing winds than RE2. Very low soft coral diversity and cover, but rich in gorgonians on deeper reef slopes. Influenced by episodic Burdekin River plumes and other annual river plumes. Very muddy in sheltered areas and on deeper slopes. Sediment resuspension during south-east trade winds.</p>
<p>RE4 Coastal Southern Reefs Moderate tidal ranges, moderate to high turbidity. Broad Sound mouth and Proserpine River influence on water quality. Varying exposure levels within the region, fairly high habitat diversity. Biologically distinct.</p>

<p>RE5 High Tidal Fringing Reefs Very high turbidity, thus habitat for light-avoiding benthos at the base of the reefs. Strong coastal influence and unusually strong currents for inshore area, strong tidal movements and high tidal range. Well-developed fringing reefs, with poor hard and soft coral communities, but rich gorgonian and algal communities.</p>
<p>RE6 Incipient Reefs Area has lots of algae and only incipient reefs. Very high turbidity and tidal movements. Strong southern influences on coral and algal species.</p>
<p>RE7 Tidal Mud Flat Reefs Greatest tidal range and tidal movements on the GBR. Higher turbidity than RE5 and RE6. Very few reefs or corals, but distinct algal communities.</p>
<p>RE8 Coastal Southern Fringing Reefs Dominated by episodic Fitzroy River flood plumes. Southern influence in algal species. Fringing reefs around high continental islands with high cover of hard and soft coral and algae, but low coral diversity.</p>
<p>RF1 Northern Open Lagoon Reefs Small islands and low vegetated isles with fringing reefs. Muddy influence from wet tropical rivers. Distinct in terms of reef size and assemblages (soft coral, fish and algae).</p>
<p>RF2 Central Open Lagoon Reefs Region dominated by episodic Burdekin flood plumes. Sea floor deeper and lagoon significantly wider, with more tidal movement than RF1. Few reefs and islands.</p>
<p>RG1 Sheltered Mid Shelf Reefs Sheltered by outer barrier reefs. Reefs may form lagoons. Distinct hard and soft corals, fish and algae. Octocoral assemblages diverse, mostly clear water species and some coastal species.</p>
<p>RG2 Exposed Mid Shelf Reefs Fairly exposed to Coral Sea, with clear water and strong wave action on outer area. Reefs may form lagoons. Episodic Burdekin flood plumes may reach inner reefs adjacent to RF2, resulting in greater cross-shelf variation than in many other bioregions.</p>
<p>RHE Strong Tidal Mid Shelf Reefs (East) High energy/high tidal movement. Turbid water. East Australian Current splits so that there is an eddie in the open area where there are small well-spaced reefs. Many smaller fish - possibly high recruitment area. High water column productivity. Biologically distinct (fish). Leeward parts of reefs dominated by filter-feeders. Fuzzy boundary with RSWM.</p>
<p>RHW Strong Tidal Mid Shelf Reefs (West) High energy/high tidal movement. Turbid water. High water column productivity. Biologically distinct (fish). Leeward parts of reefs dominated by filter-feeders.</p>
<p>RHC High Continental Island Reefs <i>Palm Islands:</i> Geomorphologically unique, with high diversity (habitat and benthos) due to exposure to clear water by the Palm Passage on the eastern sides, very sheltered and muddy coastal habitats on the protected sides, and current-swept channels between the islands. <i>Whitsunday Islands:</i> Geomorphologically unique. Both cross-shelf and north/south gradient in benthic communities. Species-poor, muddy reefs close to the Proserpine River. Unique and very fragile hard and soft coral communities in the inlets.</p>
<p>RHL Hard Line Reefs Geomorphologically distinct. Extensive outer barrier, set well back from edge of continental slope. Fish communities less diverse, but similar to Swain Reefs and Whitsundays. Strong influence from Broad Sound, high tidal energy. Current-swept channels with steep walls, sheltered leeward-reef communities</p>

with low diversity but high abundances of selected species.
<p>RK Strong Tidal Inner Mid Shelf Reefs High turbidity and very high water column productivity. Distinct from RHW and RHE. Rich bivalve, sponge and ascidian (sea squirt) dominated communities on leeward reef slopes. Distinct fish communities (including baitfish) with lower diversity. Strongly influenced by Broad Sound tidal node.</p>
<p>RCB1 Capricorn Bunker Outer Reefs RCB1 & RCB2 oceanographically isolated, may be biologically distinct from the rest of GBR. Set back from edge of continental shelf but very exposed due to local currents. Distinct differences in coral trout populations compared with the Swain Reefs and elsewhere on the GBR. High soft coral diversity.</p>
<p>RCB2 Capricorn Bunker Mid Shelf Reefs RCB1 & RCB2 oceanographically isolated, may be biologically distinct from rest of GBR. More turbid, more protected and more algae than RCB1, characteristic of mid-shelf area. Good turtle feeding habitat.</p>
<p>RSWM Swains Mid Reefs Very sheltered. Biologically distinct communities from Swains Outer Reefs (RSWO). Many cays. Fuzzy boundary with RHE.</p>
<p>RSWN Coral Sea Swains-Northern Reefs Near edge of continental slope. Northerly aspect. Biologically distinct with strong influence of Coral Sea fauna and some similarities to northern outer-shelf reefs, but lower diversity of hard and soft coral species.</p>
<p>RSWO Swains Outer Reefs Set back from shelf edge. Easterly aspect. Lower influence of Coral Sea fauna than RSWN. Biologically distinct from Mid Swains (RSWM), more similar to Capricorn Bunker Outer Reefs (RCB1). Communities on flanks and leeward sides dominated by xeniids, a large and very characteristic group of soft corals, unique in their ecology and biology.</p>

<p>Non reef bioregions of the Great Barrier Reef World Heritage Area</p>
<p>NA1 Coastal Strip Sand rather than mud, low carbonate and low nutrient. Dry tropic influence from land. Very dense seagrass in places – some areas important for dugong and turtle feeding. Boundaries of bioregion along the coast match changes in shoreline type.</p>
<p>NA3 High Nutrients Coastal Strip Terrigenous mud and high levels of nutrients from the adjoining land. Seagrass in sheltered sites only. Good turtle and dugong feeding habitat. Wet tropic influence for much of the coast.</p>
<p>NA4 Inshore Terrigenous Sands Strong Broad Sound tidal influence. Very mobile sands, little algae or seagrass.</p>
<p>NB1 Inshore Muddy Lagoon High carbonate sand, prawn habitat. Rich soft-sediment sponge fauna, 24% not yet recorded elsewhere.</p>
<p>NB3 Inner Shelf Seagrass Very sandy area with distinct invertebrate and fish communities. Seasonal seagrass in patches. Distinct gorgonian fauna, associated with low wooded islands. Boundary for sponges and gorgonians extends south to Cape Grafton only.</p>
<p>NB5 Inner Mid Shelf Lagoon Coarse sediment from land influences (medium-high land input). Sparse seagrass.</p>

<p>NB6 Inner Shelf Lagoon Continental Islands Strong currents, gravel and hydroids around Pine Peak Island. Some gorgonians and low reef sites, water very turbid. Seagrass meadows in some bays.</p>
<p>NB7 Mid Shelf Lagoon Muds dominate, minimal algae or seagrass. Leeward parts of Hook and Bait Reefs are geomorphologically different. Very steep, extensive benthos, gravel, low sponge diversity but only 21% of species are similar to those in southern lagoonal reefs. Mobile sand dunes influenced by strong East Australian Current.</p>
<p>NB8 Capricorn Bunker Lagoon <i>Halimeda</i> and seagrass up to 50% cover. Mixing of southern inshore and tropical inshore sponge species, 28% not yet found elsewhere.</p>
<p>NC Mid Shelf Inter Reef - Seagrass Fine sediments, high carbonate content between a large number of reefs. Contains deep water shoals.</p>
<p>ND Mid Shelf Inter Reef Shelly sands, almost no fine sediments. Very little seagrass. Abundant crinoids (feather stars).</p>
<p>NE Outer Shelf Lagoon <i>Halimeda</i> Banks. <i>Caulerpa</i> only goes as far as the inner edge of the shelf edge. Eastern boundary follows the inner boundary of the Ribbon Reefs.</p>
<p>NF <i>Halimeda</i> Banks – some coral <i>Halimeda</i> and <i>Caulerpa</i> banks with deep rubble reef or sparse coral patches. NE/NF boundary follows Pollard Channel.</p>
<p>NH Mid Shelf Sandy Inter Reef Sandy, low density seagrass beds, known turtle foraging sites.</p>
<p>NI <i>Halimeda</i> Banks Dense <i>Halimeda</i>, almost no coral, some seagrass.</p>
<p>NJ Princess Charlotte Bay Outer Shelf Sandy, change to carbonate sediments. Red-spot king prawn grounds.</p>
<p>NK Princess Charlotte Bay Muddy bay, surrounded by silica sand deposits with low nutrient levels. Some seagrass.</p>
<p>NL1 Outer Shelf Algae and Seagrass Areas of medium density seagrass and medium density algae, diverse solitary corals. High diversity of sponge species at Lizard Island and North and South Direction Groups, 28% not yet recorded elsewhere on the GBR.</p>
<p>NL2 Outer Shelf Seagrass Shelly sands (very coarse) with smaller areas of seagrass and algal gardens (low density).</p>
<p>NL3 Outer Shelf Inter Reef - Central Shelly sands with very sparse algae and seagrasses.</p>
<p>NL4 Outer Shelf Inter Reef - Southern High currents. Coarse sediments. Available data indicates low biomass and high diversity of biota.</p>
<p>NL5 Swains Inter Reef Rich sponge fauna, 26% not yet recorded elsewhere on GBR, and only 31% of species occurring in both Swain and Capricorn Bunker regions. Complex and rocky in places, with lower tidal current than in NL4.</p>

Fuzzy boundary with NL4. Some <i>Halimeda</i> , and some seagrass in patches in middle Swains.
NM Mid Shelf Seagrass Dense seagrass beds. Very muddy area with distinct invertebrate and fish communities. High diversity of sponges near Turtle Islands group with 36% not yet recorded elsewhere in GBR region.
NN Capricorn Bunker Banks Pre-reef <i>Halimeda</i> deposits around Capricorn Bunker reefs. Diverse sponge fauna (187 species), mostly different from southern fauna (NB8), slightly more similar to northern island-group faunas (NL5).
NO Capricorn Trough Deep oceanic influence. Mix of pelagic (e.g. foraminifera) and <i>Halimeda</i> seabed deposits. Very fuzzy boundary between NO and NB7.
NP Eastern Plateau Based on depth, region broadens towards Eastern Plateau; mostly fine pelagic sediments.
NQ Steep Slope Very steep slope dropping off to depths of 2500+m.; slopes prone to slippages.
NR Queensland Trough More moderate slope compared to NQ; mostly fine pelagic sediments.
NS Intermediate Broad Slope Widening of slope with lower gradient; mostly fine pelagic sediments.
NTW Western Pelagic Platform Gentle broad slope, number of sediment drifts (mobile sand banks formed under East Australian Current); mostly fine pelagic sediments punctuated by many coral shoals. Oceanic sharks and large bluespot trout present.
NTE Eastern Pelagic Platform Gentle broad slope. Mostly fine pelagic sediments with several long (30 nm) E-W shoals of extensive plate corals to 5-10m depth. A number of mobile sand banks have formed under East Australian Current.
NU Terraces Characterised by hard substrate seafloor terraces at depths of 90-300m terraces punctuated by shoals to depths of around 10m.

Deep water, offshore areas

The following deep water, offshore areas extend from the edge of the continental shelf to the eastern border of the GBRWHA. They were described based largely on physical information and, for the purposes of the Representative Areas Program, and until further information is gained, they are treated as separate bioregions.

- X1 Far Northern Offshelf
- X2 Offshelf Queensland Trough
- X3 Outer Far Northern Inter Reef
- X4 Capricorn Bunker Inter Reef
- X5 Outer Central Inter Reef
- X6 Central Offshelf
- X7 Central Inter Reef
- X8 Southern Embayment

