

## IH294 Mangrove habitat complexity

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World-wide, mangrove habitats are under threat from repeated harvesting pressure. In particular, mangrove forests that fringe the Indonesian coastline are under huge ecological pressure. Of the estimated total global mangrove forests 34,931 km<sup>2</sup> (23.8%) are located in Indonesia. In addition, it is estimated that more than 31% of Indonesian mangroves have disappeared in the last 30 years.

Indeed, research has highlighted that many ecosystems are in decline – much attention towards coral reefs have demonstrated that a reduction with reef complexity – a reduction of reef fauna will also follow. The reef's nursery grounds, mangrove forests as already stated are also in decline, and their habitat complexity is also under threat – facilitated by the need for increasing woody materials used for fishing and construction. As a consequence this may also lead to a reduced faunal community structure.

Mangrove forests are considered as nursery habitats for a wide range of fauna. Many mangrove resident-animals will be under great threat if harvesting pressure continues. The remarkable unique cryptic behaviour of the dartfish for example, have an obligatory association with mangrove detritus and thus without this detrital-animal interaction the life history of the dartfish may likely be compromised. Likewise, cephalopods such as octopus will use large fallen logs to rear their young. Furthermore, some species of arachnids utilise mangrove habitats (e.g. *Desis martensi*) and many sessile invertebrates such as filter feeding bivalves, sponges and ascidians utilise the hard surface of the complex root structures belonging to the *Rhizophora stylosa* trees. Ultimately, many organisms depend upon mangrove ecosystems for their longevity and survival – without mangrove forests the life histories of many marine animals will be ecologically challenged and threatened.

### 1. **Brief experimental design:**

This will be a snorkelling based project within the unique mangroves of the tropical Wakatobi. Assess each habitat within the mangrove ecosystem, such as the complex root systems, the extensive sea grass channels and the large woody detritus (LWD) using a Habitat Assessment Score (H.A.S). Complete fish transects in each area to determine the diversity of fish communities, and then correlate with the H.A.S to highlight if a reduced habitat complexity does indeed correlate towards a reduction of mangrove faunal communities.

In addition, during low tidal events, belt transects will be used to estimate the volume of large woody detritus and density of aerial root structures to determine the availability of hard substratum. Furthermore, samples of the woody detritus will be analysed in the lab to estimate the level of cryptic biodiversity. To add, aerial prop-root faunal communities will be recorded to establish the epifaunal diversity mediated by the root complexity. These comprehensive ecological assessments of high tide fish communities coupled with low tide cryptic invertebrate communities will increase our understanding of the true biodiversity within mangrove habitats of the Wakatobi.

