Chapter 5

Biodiversity and Conservation Priorities of Reef-building Corals in Bali, Indonesia

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EXECUTIVE SUMMARY

This report describes the results of surveys of biodiversity and status of coral communities of Bali, surveyed in November 2008 (Nusa Penida area) and April–May 2011 (main island). This area forms part of the Nusa Tenggara region of the Lesser Sunda Islands, at the southern edge of the Coral Triangle (CT), earth's most diverse tropical marine province. The surveys were designed to assess biodiversity and ecological condition and identify sites of conservation priority, towards expanding and improving functionality of the Marine Protected Areas network. The surveys formed part of a collaborative project between Conservation International and partners, including the Indonesian Department of Nature Conservation (PHKA), the Indonesian Ministry of Marine Affairs and Fisheries (MMAF), the Indonesian Institute of Sciences (LIPI).

A total of 85 stations (adjacent deep and shallow areas) at 48 sites (individual GPS locations) were surveyed. Coral communities were assessed in a broad range of wave exposure, current and sea temperature regimes, and included all main habitat types: cool water rocky shores, cool water reefs with broad flats, warm water reefs with broad to narrow flats, and coral communities developed on predominantly soft substrate.

The survey area is characterized by highly localized, consistent variation in several key parameters for coral growth and reef development: current flow (ranging from ca < 1 knot to > 4 knots), temperature regime (ranging during this study from ca 23–30 C, but declining to 16 C at times) and wave energy regime (ranging from ca < 1 m – 5 m), associated respectively with exposure to the Indonesian Throughflow in Lombok Strait, localized upwellings and long-period ocean swells from the Indian Ocean.

Species richness and undescribed species

Bali host a diverse reef coral fauna, with a confirmed total of 406 reef-building (hermatypic) coral species. An additional 13 species were unconfirmed, requiring further taxonomic study. At least one species, *Euphyllia* spec. nov. is new to science, and a second, *Isopora* sp., shows significant morphological difference from described species, such that there are likely to be more than 420 hermatypic Scleractinia present, in total. Notably, several widespread species exhibit consistent local morpho-types around Bali.

Within-station (point) richness around Bali averaged 112 species (s.d. 42 spp.), ranging from a low of just two species (at site B22, a muddy non-reefal location) to a high of 181 species at B16 (Jemeluk, Amed). Other species-rich sites included Menjangan N (168 spp., site B26) and Penutukang (164 spp., site B21). These results for site and overall richness are similar to those from Bunaken National Park and Wakatobi (392 and 396 spp. respectively), higher than for Komodo and Banda Islands (342 and 301 spp.), and lower than Derewan, Raja Ampat, Teluk Cenderwasih, Fak-Fak/Kaimana and Halmahera (all with more ca 450 spp. or more).

Community structure

At site level, 5 major coral community types were identified, related to levels of exposure to waves, currents — upwelling, substrate type and geographic location. These five communities were further sub-divided into 10 main coral assemblages. Each of the five communities was characterized by a more-or-less distinctive suite of species and benthic attributes.