



Introduction

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Chapter 1

Introduction

1. INTRODUCTION

Bali's coasts and sea support an array of very productive ecosystems that provide goods and services to its communities. The dominant tourism industry also contributes to the economic growth and prosperity of these communities. However, this industry has simultaneously created conflicts of interest between stakeholders and resource users. Uncontrolled coastal development has also triggered environmental degradation in Bali.

Anticipating the various impacts of Bali's development, the provincial government has worked hard to create long-term management strategies, for example, through the production of a spatial plan (Local Regulation No. 16/2009). An important component of this initiative is to design and implement Marine Protected Areas (MPAs) and a network of MPAs in Bali, focusing on sustainable and compatible economic activities (e.g., marine tourism, mariculture and sustainable artisanal fisheries).

The Bali provincial government conducted a stakeholder workshop in June 2010 to kick-start the establishment of MPAs and a network of MPAs on the island. The workshop was organised by the Bali Marine and Fisheries Agency, the Nature Conservation Agency, the University of Warmadewa, the University of Udayana, the United States Agency for International Development (USAID), Conservation International (CI) Indonesia, and the Bali Sea Partnership. It was attended by approximately 70 participants from the provincial and regency level government agencies, universities, NGOs, private sectors, and community groups who work on Bali's coastal issues.

The workshop resulted in several important recommendations, for example, the identification of 25 priority sites to consider in the development of Bali MPAs and an island-wide MPA network. The suggested sites included those with existing management regimes (e.g., the Bali Barat National Park and Nusa Penida MPAs) and other locations without any legal management authorities. Later, seven out of the 25 priority sites were selected as MPA candidate sites. However, the 25 priority sites remain important in the future management of marine ecosystems in Bali.

A comprehensive study on the status of marine resources in Bali was considered important in the development of MPAs around the island. The Marine Rapid Assessment Program (MRAP) is a method to rapidly examine existing marine resources. This MRAP report thus contains basic data and information on the current status of marine resources in Bali to support management and conservation efforts.

1.1 Goals

The goals of Bali Marine Rapid Assessment Program (MRAP) are:

1. To assess the current state of Bali's marine biodiversity (including coral reefs status, hard coral resilience levels, and the status of reef fish, echinoderms and crustaceans)
2. To collect detailed spatial data on biological features to consider in the development of MPAs, MPA zoning and an MPA network; with particular regard to the identification of high value conservation areas for endemic and rare coral cover, reef fish, fish spawning and aggregation sites, coral communities exposed to anthropogenic activities, and other biological features
3. To record and integrate the socio-cultural and economic values of Bali's communities into future MPA management

1.2 Method

Methods used in the 2011 Bali MRAP are methods that have been developed by Conservation International across more than 20 years. They have been used in over 23 countries in the Indian, Pacific and Atlantic Oceans. The methods for coral reef and reef fish are as follows:

A. Reef fish

The reef fish study was led by reef fish expert Dr. Gerald Allen using underwater visual census. The survey was conducted for 60–100 minutes per site. Every observed fish species was recorded using pencil on waterproof paper attached to a clipboard. Scientists conducted the first surveys at a 30–50m water depth before proceeding to shallow water. Most of the time, the surveys were conducted at a 5–12m depth. The number and species of reef fish are usually more abundant at this depth. The team also recorded the substrate type (e.g., rocky, flat reef, drop off, cave, rubble or sand).

B. Hard coral (species diversity and reef status)

The hard coral survey was led by Dr. Lyndon DeVantier, a coral expert of more than 20 years. Surveys were conducted at several dive sites representative of a range of habitat types and environmental conditions (e.g., exposure, slope and depth).

Shallow and deep coral communities were surveyed at the same time at all dive sites. Different depths were surveyed at deeper slopes (usually deeper than 10m), shallow slopes, reef tips and reef flats (usually shallower than 10m).

During the 13 days of the MRAP survey, the team covered 33 sites in an anti-clockwise fashion from the Kutuh Temple in southern Bali to Klatakan in western Bali (Figure 1.2, Table 1.1). The sites were selected based on the recommendations of the June 2010 workshop. Thus, the survey was designed to allow the team to cover as many of the 25 potential sites as possible. Combining the results of the 2011 mainland Bali MRAP (33 sites) with those of the 2008 Nusa Penida MRAP (19 sites), the data in this report cover 52 sites in total: representative information to describe the status of coastal ecosystems in Bali. An exception is made for the western coast of Bali (southeast from Klatakan to Uluwatu); the survey of the western coast was made impossible due to strong currents and waves. Thus, additional efforts need to be made to ensure that this part of the island is surveyed in the future.

Table 1.1. The list of survey sites for the Bali MRAP 29 April to 11 May 2011. The fish survey was not conducted in sites 6, 8 and 28. Site 26 was only surveyed for the reef fish component.

Site No.	Survey date	Location name	Coordinates
1	29 April 11	Terora, Sanur (Grand Mirage)	08° 46.228' S, 115° 13.805' E
2	29 April 11	Glady Willis, Nusa Dua (Grand Mirage)	08° 41.057' S, 115° 16.095' E
3	29 April 11	Sanur Channel	08° 42.625' S, 115° 16.282' E
4	30 April 11	Kutuh Temple, Bukit	08° 50.617' S, 115° 12.336' E
5	30 April 11	Nusa Dua	08° 48.025' S, 115° 14.356' E
6	30 April 11	Melia Bali, Nusa Dua	08° 47.608' S, 115° 14.192' E
7	1 May 11	Batu Tiga-Barat (Gili Mimpang)	08° 31.527' S, 115° 34.519' E
8	1 May 11	Batu Tiga-Timur	08° 31.633' S, 115° 34.585' E
9	1 May 11	Tanjung Jepun (Padang Bai)	08° 31.138' S, 115° 30.619' E
10	2 May 11	Gili Tepekong (Candidasa)	08° 31.885' S, 115° 35.167' E
11	2 May 11	Gili Biaha/Tanjung Pasir Putih	08° 30.270' S, 115° 36.771' E
12	3 May 11	Seraya	08° 26.010' S, 115° 41.274' E
13	3 May 11	Gili Selang-Utara	08° 23.841' S, 115° 42.647' E
14	3 May 11	Gili Selang-Selatan	08° 24.079' S, 115° 42.679' E
15	4 May 11	Bunutan, Amed	08° 20.731' S, 115° 40.826' E
16	4 May 11	Jemeluk, Amed	08° 20.221' S, 115° 39.617' E
17	4 May 11	Kepah, Amed	08° 20.024' S, 115° 39.244' E
18	5 May 11	Batu Klebit, Tulamben	08° 16.696' S, 115° 35.826' E
19	5 May 11	Tukad Abu, Tulamben	08° 17.603' S, 115° 36.599' E
20	6 May 11	Alamanda, Buleleng	08° 08.969' S, 115° 24.733' E
21	6 May 11	Penuktukan, Buleleng	08° 08.270' S, 115° 23.622' E
22	7 May 11	Puri Jati, Lovina	08° 11.032' S, 114° 54.869' E
23	7 May 11	Kalang Anyar, Lovina	08° 11.344' S, 114° 53.841' E
24	8 May 11	Taka Pemuteran	08° 07.775' S, 114° 40.007' E
25	8 May 11	Sumber Kima	08° 06.711' S, 114° 36.451' E
26	9 May 11	Anchor Wreck, Menjangan	08° 05.467' S, 114° 30.131' E
27	9 May 11	Coral Garden, Menjangan	08° 05.485' S, 114° 30.486' E
28	9 May 11	Post 2, Menjangan	08° 05.813' S, 114° 31.608' E
29	10 May 11	Secret Bay, Gilimanuk	08° 10.862' S, 114° 26.544' E
30	10 May 11	Secret Bay Reef -utara, Gilimanuk	08° 09.771' S, 114° 27.116' E
31	11 May 11	Klatakan- Pearl Farm 1	08° 13.911' S, 114° 27.249' E
32	11 May 11	Klatakan-Pearl Farm 2	08° 14.000' S, 114° 27.463' E
33	8 May 11	Pura Pulaki	08° 08.719' S, 114° 40.756' E



Figure 1.1. Priority sites to be developed as MPAs in Bali (the result of a stakeholder workshop in June 2010)

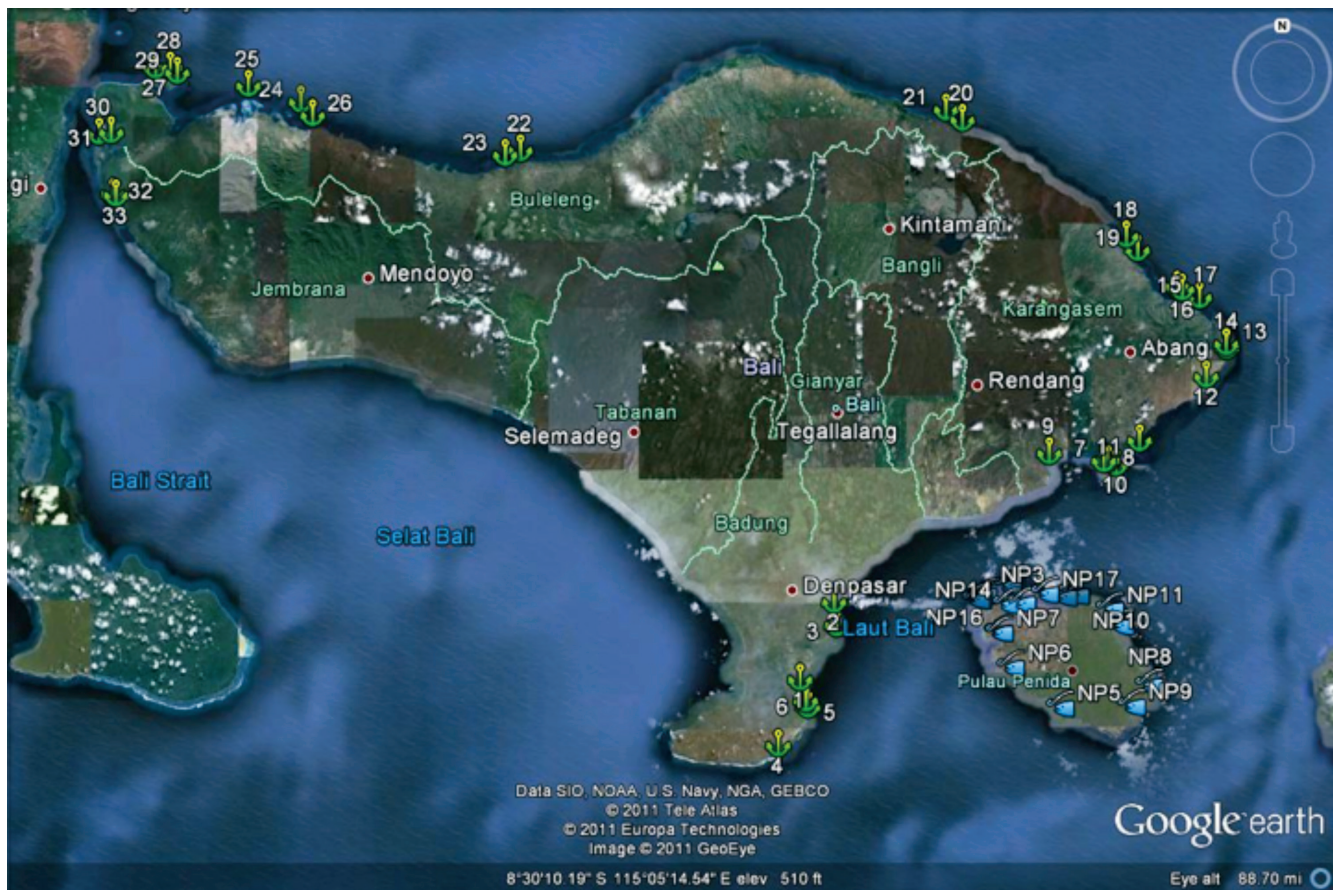


Figure 1.2. The locations of MRAP in mainland Bali (2011) and Nusa Penida (2008)