

FRONTIER

Frontier-Cambodia Marine Programme

Phase 131

Initial Project Report

January – March 2013



Photo by Helen Capell

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1. Introduction

Cambodia's coastline is 435km long and includes 69 islands within the Gulf of Thailand (Touch, 1995). Many of these islands are fringed by coral reefs and associated seagrass beds and mangrove habitats (Figure 1) providing critical habitats for thousands of marine species. Coral reefs are among the most diverse ecosystems on the planet (Bryant *et al.* 1998). The coral reefs of Southeast Asia are the most species-rich on earth, but they are also the most threatened of any region. Over half of Southeast Asia's reefs are classified as "high risk", primarily from coastal development and fishing related pressures. Until the 1950s the main threats to coral reefs were storms, volcanic eruptions and periodic ice ages (Bryant *et al.* 1998). However, in the last 50 years humans have added new pressures ranging from mining coral reefs for building materials, widespread pollution and destructive fishing practices. Increased coastal tourism can also have a detrimental impact on reef ecosystems (Hawkins and Roberts 1994). Tourism in Cambodia is on the increase, with Tong Khon, the country's minister of tourism, stating that the number of foreign tourists visiting Cambodia in the first nine months of 2010 was 1.8 million, an increase of 15% compared to 2009 (Radio Free Asia, 2011).

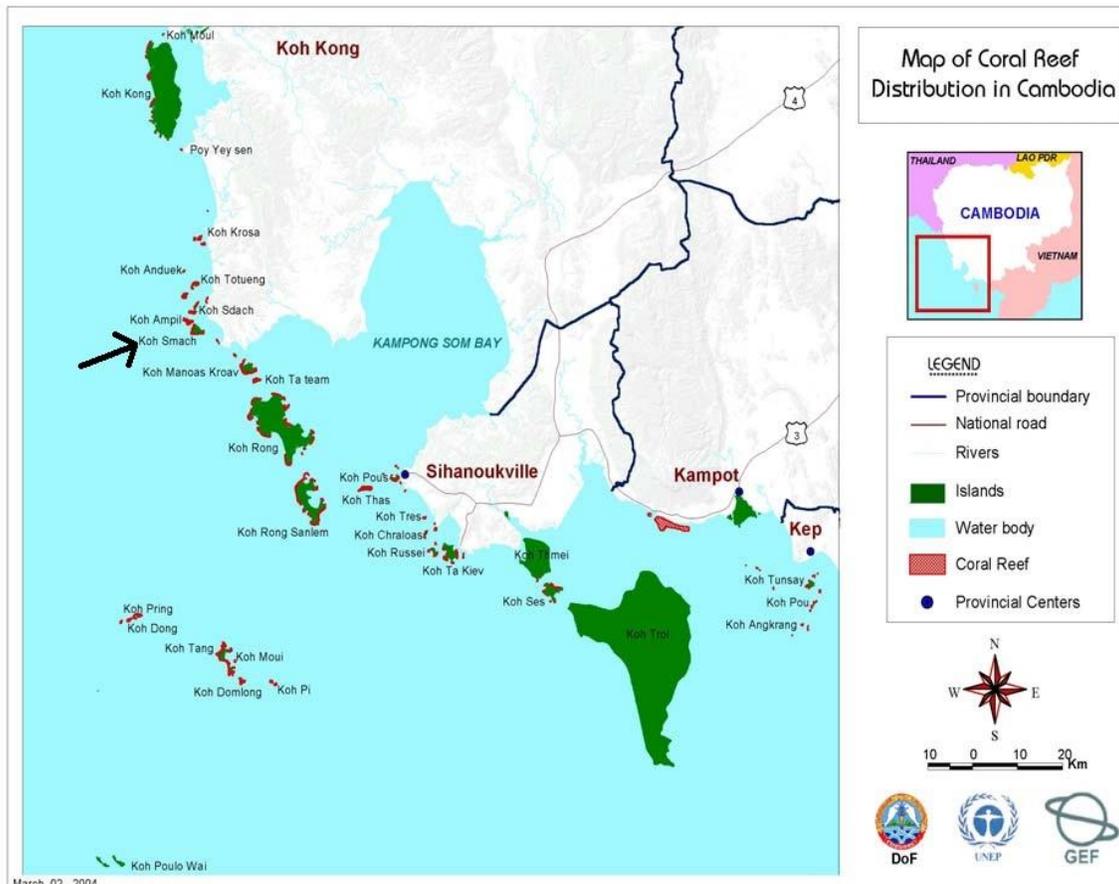


Figure 1 - A map of coastal Cambodia. An arrow highlights Koh Smach, the study site. Areas highlighted in red are areas of coral reef.

Information about Cambodia's reef systems is sparse and poorly documented. There is an urgent need for accurate data on the current status of these critical habitats (Chou *et al.*, 2003; Wilkinson, 2008). Furthermore, assistance is needed for long-term monitoring programmes supported by in-country commitment (Wilkinson, 2008). Past studies in Cambodia have produced estimates of species number for a variety of taxa, including hard and soft corals, marine fish and molluscs (*Appendix 1*). However, since the most recent of these studies was published in 2003, there is need for more up-to-date records.

1.1 Cambodia Marine Programme

As this is a completely new project, the first few weeks of this phase were spent identifying the frequent, less frequent and infrequent fish species found on the local reef. Information on species present in local waters was also gathered from conversations with the Shallow Waters dive shop on the neighboring island of Koh Sdach. On the 30th of January, a species list of all fish species known to be present was sent to the London HQ Research and Development department (*Appendix 1*).

During the first two weeks of February, continued survey sessions were completed in order to reduce the survey species list down to frequent, less frequent and infrequent fish species to be observed on the surrounding reef of the North West beach of Koh Smach. The third week of February was spent selecting ten permanent transect sites along the North West beach of Koh Smach, followed by marking of each transect with old fishing buoys and sand filled plastic bottles as weights. The last week of February was spent conducting pilot surveys in order to test the methodology before the arrival of the project's first volunteers. During this time KM also created three science lectures to give to volunteers and created a schedule of survey activities.

The week starting 4th of March saw the first volunteers arrive on Koh Smach. Their first two days were spent settling in to camp and completing health and safety tests. This was followed by volunteers receiving science lectures, and species identification training, with marine species broken down into frequent, less frequent and infrequent species to aid learning. The volunteers then spent time revising frequent and less frequent species, and tests were given on each category. This was followed by the volunteers revising infrequent species and completing their final tests for identification of all species. The pass rate for these tests was set at 95%.

The week after was spent conducting in-water species tests, during which frequent and less frequent species had to be correctly identified three times. These in-water tests took longer than expected, and some sessions were conducted on a one to one basis as larger groups were found to be too difficult.

Finally an in-water size differentiation test was completed, and pilot surveys were conducted. Actual surveys were also conducted, and a total 50 surveys within across ten transects have been completed during the phase (five on each transect).

2. Achievements

Over the last four months on Koh Smach the following achievements have been made;

1. Compilation of marine fish survey species list
2. Selection of ten permanent belt transect sites spaced 25m apart
3. Marking of the start of the ten permanent belt transect sites
4. Creation of three science lectures to give to volunteers
5. Implementation of theoretical species identification tests
6. Implementation of in-water survey species identification and size differentiation tests
7. Successful completion of science training and surveying by four volunteers
8. 50 successfully completed fish surveys across the ten belt transect sites

3. Methodology

Members of SEE's Cambodia staff have visited Koh Smach, and with the help of the local community have already established the location of the project camp. With appropriate training, non-specialist volunteer divers are able to provide useful data for coastal zone management at little or no cost to the host country (Hunter and Maragos, 1992; Mumby et al., 1995; Wells, 1995; Darwall and Dulvy, 1996; Erdmann et al. 1997). The methodology implemented for fish surveys is adapted from reef check methodology and is as follows:

- 1) Before entering the water, buddy teams record transect number/s, sea state, cloud cover, tidal level and start time.
- 2) Buddy teams swim to marker buoy of specified transect and use survey tape to measure start depth by lowering the weighted end to the seabed.
- 3) One buddy member uses the compass and takes a 300 degree bearing swimming slowly in that direction whilst the second buddy member lays the tape out to a distance of 20 metres.
- 4) At 20 metres, the buddy team swims back the length of the transect with one surveying 2.5m left of the tape and the other surveying 2.5m right of the tape, both recording species abundance and sizes.
- 5) At the end of the 20m, the team waits one minute and swims back the length of the transect again recording species abundance and sizes. This allows other species to occupy the area and also be recorded.

- 6) At the end of the survey, one team member keeps a visual reference of the transect end point whilst the other reels the tape in and returns to the end point with the tape where the water depth is then measured and recorded.
- 7) Buddy teams then return to base, note the end time and data is verified and recorded by staff.

4. Aims for next quarter

- 1) Continue to conduct fish abundance surveys
- 2) Compile information on the community composition of coral and invertebrates present around the reef
- 3) Create science lectures on coral and invertebrate biodiversity and their importance
- 4) Conduct surveys on coral and invertebrate abundance
- 5) Assess coral damage from anthropogenic sources e.g. bleaching, anchor damage, sedimentation and marine debris
- 6) Conduct socioeconomic interviews with the local inhabitants of Koh Smach

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6. Appendices

Appendix 1

Species physically apparently present in the local area but not currently physically observed are in standard format.

Species physically observed are highlighted in green.

Common name	Scientific name
Anemone sp	Pomacentridae/Amphiprioninae
Banded Butterflyfish	<i>Chaetodon octofasciatus</i>
Banded Sea Snake	<i>Laticauda colubrina</i>
Baracuda sp	<i>Sphyraena</i> sp
Barramundi Grouper	<i>Cromileptes altivelis</i>
Black Blotched Porcupinefish	<i>Diodon liturosus</i>
Blacktail Snapper	<i>Lutjanus bohar</i>
Blacktip Grouper	<i>Epinephelus fasciatus</i>
Blenny sp	Blenniidae
Blue Bannerfish	<i>Heniochus</i> sp
Blue Lined Grouper	<i>Cephalopholis Formosa</i>
Bluespotted Ribbontail Ray	<i>Taeniura lymma</i>
Bluestreak Cleaner Wrasse	<i>Labroides dimidiatus</i>
Boxfish sp	Ostraciidae
Bridled Monocle Bream	<i>Scolopsis bilineatus</i>
Brown Banded Bamboo Shark	<i>Chiloscyllium punctatum</i>
Brown Sweetlips	<i>Plectorhinchus gibbosus</i>
Bumphead Parrotfish	<i>Bolbometopon muricatum</i>
Cardinalfish sp	Apogonidae
Checkerboard Wrasse	<i>Halichoeres hortulanus</i>
Checkered Snapper	<i>Lutjanus decussates</i>
Chocolate Grouper	<i>Cephalopholis boenak</i>
Coral Rabbitfish	<i>Siganus corallines</i>
Crescent Wrasse	<i>Thalassoma lunare</i>
Diamondfish	<i>Monodactylus argenteus</i>
Doublebanded Soapfish	<i>Diploprion bifasciatum</i>
Ember Parrotfish	<i>Scarus rubroviolaceus</i>
Emperor sp	Lethrinidae
Filefish sp	Monacanthidae
Freckled Goatfish	<i>Upeneus tragula</i>
Freckled Grouper	<i>Cephalopholis microprion</i>
Fusilier sp	Caesionidae
Goby sp	Gobiidae
Golden Rabbitfish	<i>Siganus guttatus</i>

Hawkfish sp	Cirrhitidae
Honeycomb Grouper	<i>Epinephelus merra</i>
Humphead Wrasse	<i>Cheilinus undulates</i>
Indian Goatfish	<i>Parupeneus indicus</i>
Jack (Trevally) sp	Carangidae
Java Rabbitfish	<i>Siganus javus</i>
Lizardfish sp	Synodontidae
Long Beaked Coralfish	<i>Chelmon rostratus</i>
Longfin Grouper	<i>Epinephelus quoyanus</i>
Manyspotted Sweetlips	<i>Plectorhinchus chaetodonoides</i>
Mullet sp	<i>Crenimugil/Liza/Neomyxus</i> sp
Peacock Grouper	<i>Cephalopholis argus</i>
Pipefish sp	Syngnathidae
Pufferfish sp	<i>Arothron</i> sp
Quoy's Parrotfish	<i>Scarus quoyi</i>
Rainbow Monocle Bream	<i>Scolopsis temporalis</i>
Red Breasted Wrasse	<i>Cheilinus fasciatus</i>
Red Snapper	<i>Lutjanus bohar</i>
Reef Needlefish	<i>Strongylura incisa</i>
Ringed Angelfish	<i>Pomacanthus annularis</i>
Scorpionfish sp	Scorpaenidae
Seahorse sp	Syngnathidae
Sergeant sp Damsel sp	Pomacentridae
Soldierfish sp	<i>Myripristis</i> sp
Spotted Coral Grouper	<i>Plectropomus maculatus</i>
Square Tail Grouper	<i>Plectropomus areolatus</i>
Squirrelfish sp	<i>Neoniphon/Sargocentron</i> sp
Starry Grouper	<i>Cephalopholis polyspila</i>
Surf Parrotfish	<i>Scarus rivulatus</i>
Teira Batfish sp	<i>Platax teira</i>
Triggerfish sp	Balistidae
Tripletail Wrasse	<i>Cheilinus trilobatus</i>
Vermiculated Rabbitfish	<i>Siganus vermiculatus</i>
Virgate Rabbitfish	<i>Siganus virgatus</i>
Volcano Sweeper	<i>Pempheris vanicolensis</i>
White Streaked Monocle Bream	<i>Scolopsis ciliatus</i>
White-eyed Moray	<i>Gymnothorax thyrsoideus</i>
Yellowscale Parrotfish	<i>Scarus ghobban</i>