UNIVERSITY OF EDINBURGH DAVIS TRUST

PRELIMINARY REPORT OF THE

Collaborative Reef Research Expedition

University of Edinburgh (EUCARE) & Zanzibar Institute of Marine Science (ZIMS)

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3rd July – 8th August 2002

Nungwi Village, Unguja Island (Zanzibar) Tanzania

Team Members
Christina Corbett, Mike Cucknell, Al Harris, James Carter-Johnson, Anna Lewis, Matt Linnecar, Jessica Loden, Sue Mitchell, Tom Savage, Harriet Usher

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THE FINAL REPORT OF THIS EXPEDITION WILL BE PUBLISHED IN JANUARY 2003

Aims of the expedition:

The aim of the Zanzibar Reef Research Expedition was to describe the unexplored offshore fringing coral reef habitats of the West coast of Unguja Island, Zanzibar, and to resurvey reefs on Mnemba Island to enable analysis of change or reef recovery since El Nino events. Specific objectives included:

- Description of important habitats
- Mapping of the coral reefs
- Description of the status of the coral reefs & resources (eg. Reef cover, coral identification, fish & invertebrate counts)
- Description of physical processes and threats influencing life on the reefs.

Figure 1

Above: Unguja Island, Tanzania. The locations of the offshore reefs are shown in figure 2.

The unexplored reef habitats we surveyed included the Tumbatu patches, as shown in figure 2.

The distribution of coral reefs around Unguja Island, Zanzibar.

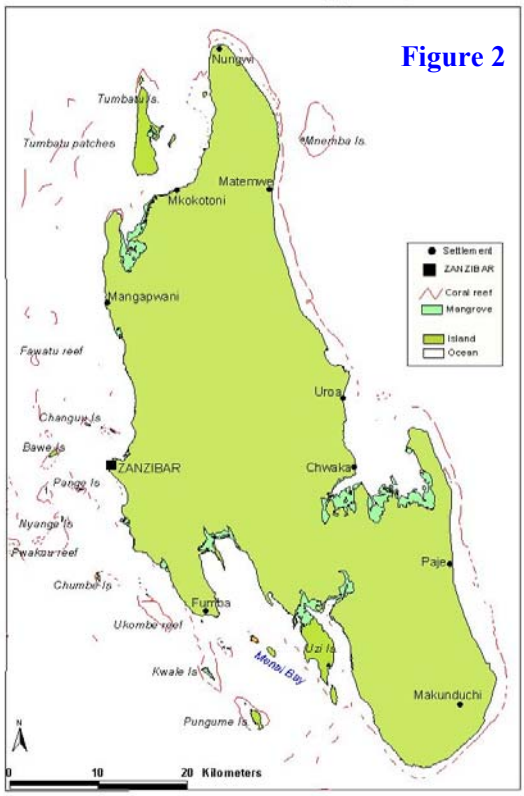

Figure 2

Background of project:

Zanzibar's coral reefs are a vital resource base for all its coastal communities. With the continued growth of coastal populations and the concomitant increase in the need for marine resources, the island's coral reefs stand at the face of overexploitation, and are being subjected to widespread degradation due to destructive fishing practices and increasing levels of pollutants from expanding human populations.

The expansion of urban areas and the development of coastal tourist facilities (particularly on the north coast) means that the island's coral reefs are coming under increasing pressure to provide even more resources than they have historically been required to deliver.

The main anthropogenic threats to the coral reefs of Zanzibar include overexploitation, destructive and illegal fishing techniques (such as dynamite and cyanide fishing), anchor damage and pollution.

The expedition began in Stone Town (labelled "Zanzibar" on figure 2), where we established contact with the Zanzibar Institute of Marine Science and organized facilities and specific logistics for the expedition. We decided to base ourselves in Nungwi Village as it was particularly significant for the project having expanded considerably over a very short period of time, growing evermore reliant on its tourist trade and fisheries. Also, Nungwi provided an essential base to access the variety of reefs we were required to survey, which included those lining the northern coastline, and key areas such as Tumbatu and Mnemba Island.

Following the success of a similar expedition to Madagascar in 2001, the Institute of Marine Science in Zanzibar invited the team to undertake the expedition, and we worked alongside two of their core marine biologists to identify key sites of biodiversity for future development as marine protected areas. The expedition also worked towards achieving the main objectives of the International Coral Reef Initiative (UNEP & IUCN), which include increasing the amount of data on coral reefs in the West Indian Ocean.

Research methodology

The distribution and physical topography of the reefs of interest were identified using a combination of surface snorkellers, reconnaissance divers, boat viewers and GPS mapping techniques, and random sites were chosen using the GPS in order to provide an unbiased representation of the reef ecosystems.

Each survey generally involved four divers, though more could be used depending on the depth and/or conditions we were faced with on the day, and involved three random 10m transects set out by diver one, and marked using underwater tape-measures.

Each member of the survey team was responsible for identifying the presence and abundance of species belonging to particular taxonomic groups along the transect line. Diver one, whilst laying the line, would monitor the geomorphological class of reef and record all the 'physical data' for the transect, and then along with diver two, record the macroinvertebrate data. Diver two was also responsible for monitoring the fish species. The role of diver three was to record the Line Intersect Transect (LITs) data to give further information on the reef's topography, and diver four monitored coral and algae cover. This data was complimented by basic and oceanographic measurements recorded by the boat marshal.

Wherever possible, fishes, corals and invertebrates were identified to species level, but in the event that divers were overwhelmed with species (for example when surveying a particularly healthy reef habitat during a fast drift dive), species may have been identified as far as family level, with additional identification of important target species. Sponges and octocorals were recorded in various life form categories.

Results

Whilst the final results and conclusions are yet to be published at the time of writing, a number of interesting outcomes came about from the expedition.

- The north coast of Unguja Island, whilst maintaining a flourishing tourist trade and relying heavily on the fishing industry, is home to some of the world's most beautiful and species rich coral reefs.
- The sometimes grave consequences of sustaining such high anthropological activity was more apparent in the coastal reefs; specifically in the Kendwa region, where significant anchor damage was reported, and Nungwi's local 'Home Reef', where nets were a particularly frequent occurrence.
- The reefs with generally the highest species abundance and biodiversity were situated at Mnemba Atoll, which is world renown for its magnificence. Bottlenose and spinner dolphins, humpback whales, a whale shark, a reef shark, numerous green and hawksbill turtles, and various stingrays were sighted at this location during the course of the expedition.
- A female hawksbill turtle, *Chelonia myda*, was caught in fishing nets off Nungwi's coastline, so in conjunction with the **Mnarani Aquarium**, which was located next to our accommodation, we bought her and documented her measurements and tagging details (originally from the Seychelles), then set her free away from the danger posed by nets. We are presently in communication with the scientists involved with this particular turtle and are exchanging information to aid their research as much as possible.

Chunguza Tumbawe

("Save the Reef" in Kiswahilii)

A particularly exciting outcome of the expedition was that we set up a **permanent reef-monitoring program** in collaboration with a local dive school called 'Sensation Divers' and a selection of experts from the Department of Fisheries and Agriculture. Following a successful presentation to the local politicians and fishermen, we set up three permanent monitoring sites using rods at 20m intervals and twine to help guide the divers along the transect. GPS points provide the necessary information to lead them to each specific site. By using the protocol provided by '**ReefCheck**', our research is being continued by a member of the expedition now based in Nungwi and associates of Sensation Divers. ReefCheck data sheets will be compiled by extracting relevant data from the surveys and returned to the ReefCheck co-ordinator in USA to contribute towards a worldwide database on coral reef status (http://www.reefcheck.org/).

The three permanent sites set up were located at;

- **Kitchani Wall**, Mnemba Atoll, found off the northeastern coast of Zanzibar. There is a high level of anthropological activity around this area, with all the local dive schools taking boats of tourists to this reef on a daily basis. Also, there is a lot of fishing taking place at this site.
- **Dambwe Reef**. Situated just above the most northerly part of the island, this reef represents the Nungwi region of our reef-monitoring program, and again, is a site of high levels of fishing activity.
- **Kendwa Rocks**. This reef is located northwest of the island, and is already an area of high tourist and fishing activity, showing visible anchor damage in many places. However, we chose this particular transect because it was located right in front of a building site where a particularly large holiday complex was in the process of being built, and has the potential to be hugely detrimental to the reef's delicate ecosystem and should therefore be closely monitored for any damage.

Incidentally, following the expedition's success, Mnemba Atoll has now been made into a protected Marine Park, which we sincerely hope will encourage the continued existence of its spectacular coral reefs and diversity of endemic species.