



Darwin Initiative Annual Report



Darwin Project Information

Project Ref Number	17-002
Project Title	Managing coral reef fisheries for biodiversity, ecosystem and economic benefits
Country(ies)	Maldives
UK Contract Holder Institution	Marine Conservation Society
Host country Partner Institution(s)	Marine Research Centre, Ministry of Fisheries and Agriculture
Other Partner Institution(s)	Maldives Dive Centres / Tourist Resorts
Darwin Grant Value	£220,000
Start/End dates of Project	April 2009 – March 2013
Reporting period & report number	1 st April 2011 to 31 st March 2012 Annual Report N° 3
Project Leader Name	Dr Elizabeth Wood, MCS
Project website	http://www.mcsuk.org/conservation_in_action/Coral+reefs/Maldives/Maldives
Author(s) and main contributors, date	Dr Elizabeth Wood, Shahaama Sattar, Ahmed Najeeb, Mohamed Ushan, Fahmeeda Islam, May 2012

1. Project Background

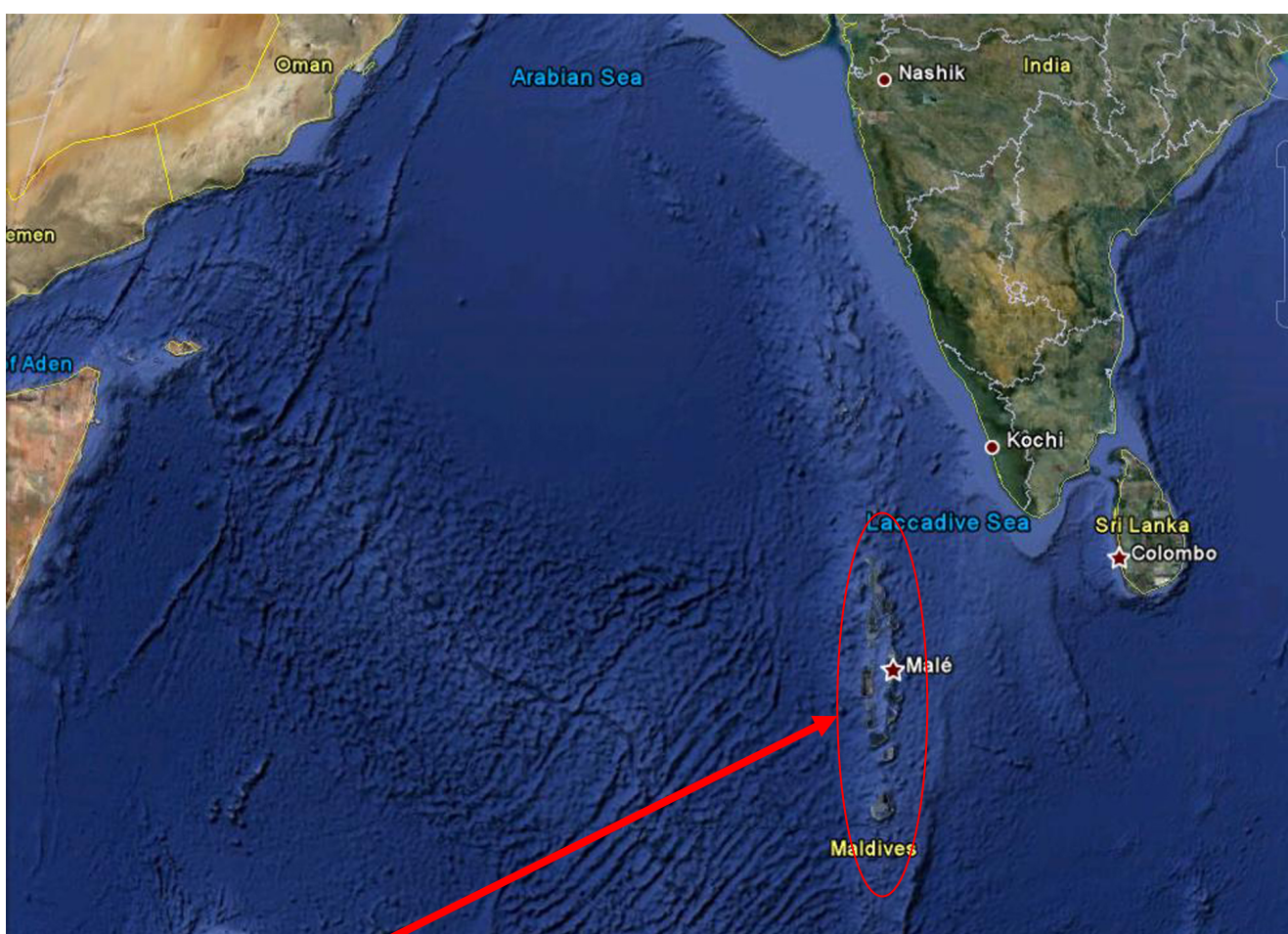
The project is based in the Maldives - an archipelago of nearly 1,200 low-lying coral islands in the central Indian Ocean. The Maldives National Biodiversity Strategy and Action Plan (NBSAP), produced in 2002 states that "The greatest diversity of life in the Maldives occurs in the coral reefs ... the life on the reefs is characterised by high diversity and low abundance". The nation's coral reefs also underpin the two mainstays of the Maldives economy – tourism and fisheries.

One of the attractions of the Maldives as a tourist destination is the opportunity to see healthy populations of a wide variety of coral reef fish. Apart from this indirect value, coral reef fish are of direct fishery value. At least 70 species of reef and reef-associated species are targeted for food (local consumption and export) and over 120 species for the ornamental trade.

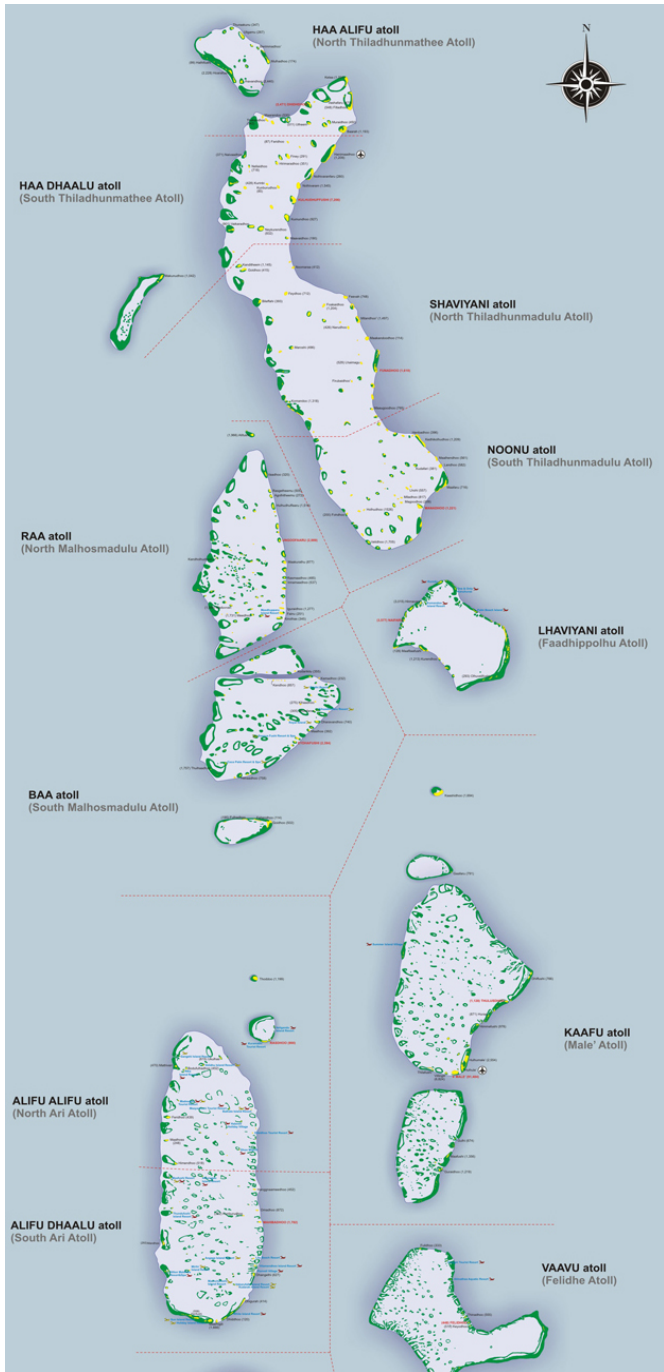
A report on the grouper fishery by the Marine Research Centre (2005) highlighted a sharp declining trend in catch since a peak in catch in 1997, three years after the fishery started in 1994. The report recommended that action be taken to regulate fishing effort and strengthen collection of catch and effort data and export data. A separate report by MRC (2008) on the fishery for reef fish (including snappers, emperors, groupers and others) highlighted the fact that demand for coral reef fish has tripled in the last 15 years and will continue to increase as tourism spreads through the Maldives. The report stresses that the status of the fishery is not well understood and says that survey and management of reef fish resources is critically important.

A report by MRC (2004) on the aquarium fishery called for a number of actions to be taken to ensure sustainability of the trade, including introduction of fishery log books, stock assessment of target species, and setting of catch quotas based on recent population data.

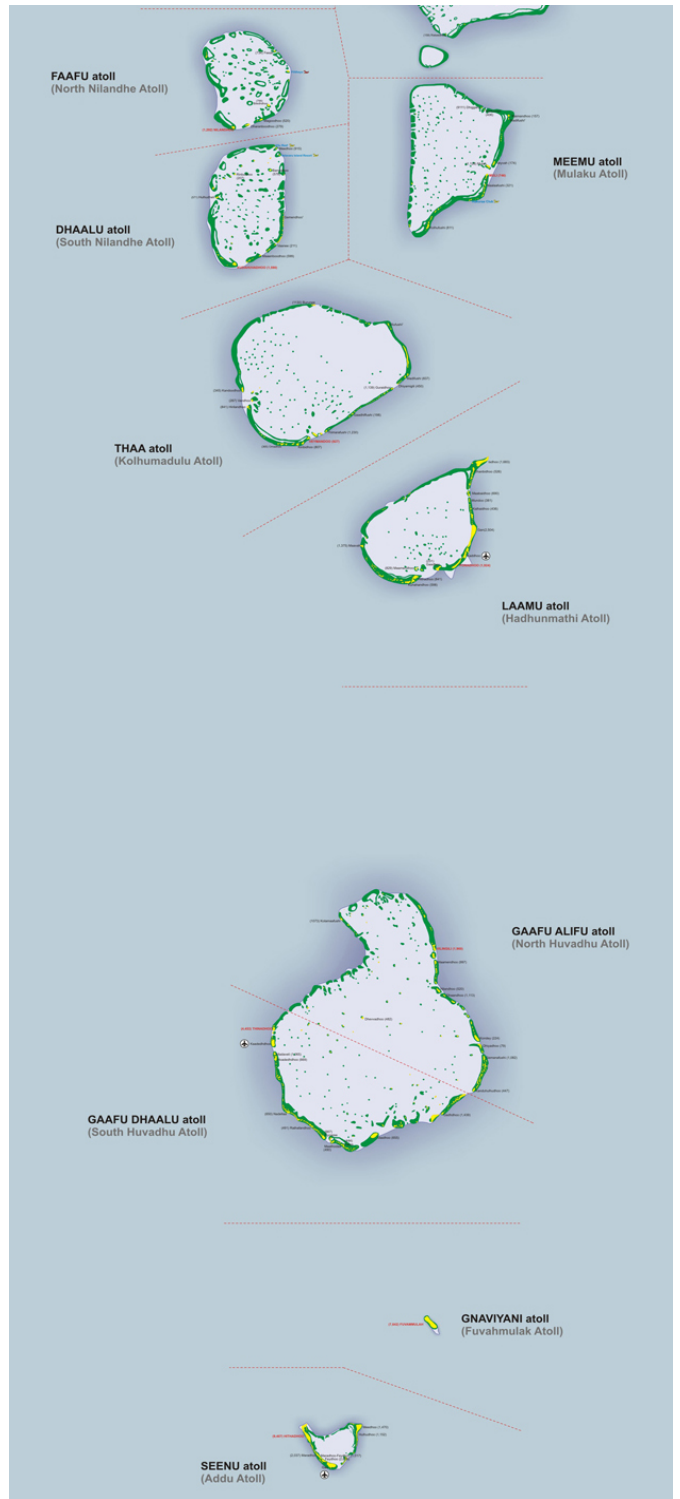
The project seeks to carry many of these actions forward and to ensure that reef fisheries in the Maldives are sustainable. The aim is to ensure that food security is guaranteed into the future, biodiversity and the livelihoods of fishers are protected and the reefs continue to attract visitors and support the tourist industry.



Location of Project



Maldives northern atolls



Maldives southern atolls

2. Project Partnerships

The project partner in Maldives is the Marine Research Centre (MRC), which is part of the Ministry of Fisheries and Agriculture and is responsible for carrying out marine resource surveys and for collecting fishery data. The project counterpart from MRC (Shahaama Sattar) resigned from MRC in May 2011 but formally agreed (with approval from the Fisheries Ministry and the Director of MRC) to continue to co-ordinate technical aspects of the project.

MCS and MRC work closely on the project and manage it jointly. The core team comprises Elizabeth Wood (project manager, MCS), Shahaama Sattar (project counterpart), Fahmeeda Islam (MRC) and the two full time project staff who are employed by MRC but 100% funded through the Darwin Initiative. These are Mohamed Ushan, Reef Survey Project Officer and Ahmed Najeeb, Reef Fishery Project Officer.

The project staff work together at MRC and there is regular e-mail contact between all the team members to discuss project development and day-to-day activities. Other staff at MRC assist with project activities as the need arises, especially on field trips when a team of at least four people is needed to collect fishery data. In these cases, subsistence and field allowances have been provided through the DI project. We also assist MRC on programmes of mutual benefit, such as reef monitoring.

Other project partners in the Maldives are the Dive Centres and Marine Labs associated with the resorts that are scattered throughout the country. The main purpose of these collaborations is to involve Dive Centres in the project's reef monitoring programme (Fishwatch Maldives and Sharkwatch) which aims to gather data on the distribution and abundance of reef fish. Another purpose of the collaboration with the Dive Centres is to enlist their help in recording use of reef fish by the resort restaurants and also recreational night fishing.

The project is continuing to collaborate closely with fishermen, fish traders and exporters in both the aquarium trade and food sectors. These stakeholders depend on, and have an extensive knowledge of reef resources and we are ensuring that they are fully involved in all aspects of the project. Grouper fishers and exporters participated in the development of the Maldives Grouper Management Plan which was finalised in the latter part of the year. We have also had continued dialogue with the aquarium fishery companies with regard to reporting of catch data and setting of species quotas.

Other Collaboration

During the third year of the project we have continued to meet and consult with government departments and representatives from international programmes that are also involved in marine resource survey and management. The aim of these consultations has been to provide updates on project progress, discuss issues of mutual interest and see how we can continue to work together to address conservation and management issues.

Ministry of Fisheries and Agriculture (MOFA)

We have continued to have regular meetings with MOFA and the Fisheries Management Authority (FMA) within MOFA to discuss project progress, the grouper management plan and monitoring of the other fisheries. There was a change in government early in 2012 and the Project Team met with the new Fisheries Minister (Ahmed Shafeeu) to brief him about the work being undertaken through the collaboration between MCS and MRC. The project team also briefed the Fisheries Advisory Board (established within MOFA) on technical details and rationale behind the Grouper Management Plan. FAB is a statutory body comprising representatives from the government and fishing industry and has to ratify new legislation before it passes to the Cabinet to be gazetted.

Environmental Protection Agency (EPA)

Environmental Protection Agency (EPA) is an independent legal regulatory entity under the Ministry of Environment and its responsibilities include Marine Protected Areas and protected species. We have maintained contacts with EPA throughout the year and also arranged a special meeting to discuss the proposed Grouper Spawning Aggregation sites to be protected from all activities under the Grouper Fishery Management Plan.

Department of National Planning (DNP)

We have held discussions with DNP and sought their permission to carry out the Household Surveys on fish consumption. We have also liaised with them about GIS maps for the Maldives which are needed for plotting fishing activities.

Ministry of Tourism, Arts & Culture (MOTAC)

Several components of the project are connected with the Tourism Sector, where we are trying to involve resorts in fish surveys and other data collection. An attempt was made some years ago by MOTAC to collect information on landings of fish and lobsters at resorts, but take-up was limited and data are no longer being submitted. We therefore joined forces with the Ministry this year in a bid to extend and revive the initiative since it is vital to have a better understanding of fish consumption patterns. MOTAC has endorsed an initiative launched by the Darwin Project that requests resorts to provide data on fish purchase and night fishing and is requesting that all tourist facilities fully support and cooperate in this important data collection effort.

Maldives Customs Service (MCS)

Representatives from the Maldives Customs Service participated in the Grouper Management Workshop, and Darwin project staff also participated in a meeting with Maldives Custom Service, the Fisheries Management Agency and MRC staff to discuss changes in the current export procedure as they apply to aquarium fish. The new export regulations are being introduced to comply with new regulations being introduced under MOFA. These require exporters to obtain a catch certificate from the statistics unit of FMA which then has to be shown to Maldives Customs Service before export is permitted.

There was also discussion about further training of Customs staff in species identification. Customs attendees suggested that it would be more useful to give training to all staff on the focal department rather than few rotational staff by arranging it through Customs Academy.

Maldives National Defence Force (MNDF) and Marine Police

Representatives of the MNDF and Marine Police attended the Grouper Management Workshop and they confirmed their willingness to help monitor and enforce reef fishery regulations provided they were fully briefed on these matters.

Maldives Environment Management Project (MEMP).

Collaboration is continuing with the MEMP project. This 5-year project, initiated in 2008, is supported by the World Bank and funded by the Board of International Development Assistance. The project focuses on the North Province of the Maldives (Noonu, Raa, Baa and Lhaviyani Atolls) and is concentrating on solid waste management, capacity building for environment management and technical assistance for strengthening environmental monitoring. The Marine Research Centre is a key stakeholder in the project, particularly with regard to the fishery and coral reef components. The Darwin Project has worked with the MEMP monitoring team to organise survey trips and collect data that will be of benefit to both programmes. This simplifies field work logistics and reduces costs.

One of the outputs from MEMP was the production of a report in 2009, proposing 15 scalable protocols for monitoring the links between reef health, social and economic use and the vulnerability and resilience of these links to projected climate change. The Darwin Project has continued to collaborate and share information with regard to development of the MEMP monitoring and evaluation (M&E) framework. This includes collaboration on a new project (see below) which will further develop this monitoring programme.

To address climate related risks facing Maldives and strengthen the country's resilience to these risks, a multi-donor Maldives Climate Change Trust Fund (CCTF) has been established, administered by the World Bank and European Union. One of the projects being supported by CCTF is Wetlands Conservation and Coral Reef Monitoring (WCCM) which is focusing on coral reef ecosystem monitoring and management for climate change adaptation. We attended a planning workshop for this project in June 2011 and will continue to collaborate with the CCTF-WCCM team as the project progresses. It formally began early in 2012 with the aim of further developing the monitoring protocols initiated under the MEMP programme. A key objective is to develop and pilot a web-enabled coral reef monitoring framework for evidence based management of the coral reef ecosystem.

We have also been collaborating with a programme initiated by Kuoni Travel, Seamarc Pvt. Ltd., and the International Union for the Conservation of Nature (IUCN), called 'Enhancing the Resilience of Coral Reefs and Assessing Vulnerability of Ecological and Social Communities to Climate Change'. The aim of this project is to contribute to the effort to develop a standard reef monitoring programme and to provide the national government and managers with information about coral reef systems. It has adopted the Darwin Project's Fishwatch, Sharkwatch and Fish Landing programmes and is also promoting 'Bleachwatch' (an international scheme to monitor incidence of coral bleaching) and the photo survey technique (CPCe) for monitoring reef condition. We have assisted with the development of protocols for these survey techniques (Annex 1.1 and 1.2).

We attended a KUONI-IUCN-SEAMARC project planning workshop at Reethi Beach, Baa.Atoll in 2011 and this was followed by a 2-day training Workshop in September 2012 during which the local Darwin Project team provided training on Fishwatch, Sharkwatch and Fish Landing to participants from Olhuveli Resort, Kandhooma Resort, One and Only Reethi Rah Resort, Sheraton, Kuramathi Resort and Diva Resorts.

One of the Darwin project aims is to collect data on local reef fish consumption and as part of this programme we are collaborating with a local NGO called Tiny Islands that works with local communities to achieve sustainability on their islands. After training from the Darwin project staff, Tiny Islands carried out the project's fish consumption household surveys at Lh Naifaru in Lhaviyani Atoll during the latter part of 2011 and will be collecting more data at Noonu Atoll this year.

We also collaborated with the Land and Marine Environmental Resources (LaMer) Group (Maldives), Biosphere Expeditions (UK) and Six Senses Soneva Fushi (Maldives) to produce a colouring book for distribution to local school children. The booklet was adapted for the Maldives from an original story developed by MCS and the International Coral Reef Action Network (ICRAN) for Sabah, Malaysia under an earlier Darwin Project. The Maldives book has a storyline that illustrates the main issues facing coral reefs in Maldives such as climate change, fishing and tourism (Annex 5.4).

The Marine Conservation Society has continued to work with the Reef Check Foundation and helped to promote Reef Check in the Maldives through the national co-ordinator, Dr Jean-Luc Solandt, MCS Biodiversity Officer. This worldwide monitoring scheme provides information on the health and status of coral reefs and will provide additional information of relevance for the Darwin Project. MCS and Biosphere Expeditions undertook 12 survey dives around the central atolls of North Male', Rasdhoo and South Ari Atolls in Sept 2011.

3. Project progress

3.1 Progress in carrying out project activities

Output 1. Reef fish monitoring programme established and coral reef fish stock assessments / habitat assessments completed

Activity 1.1. Stakeholder meetings to discuss aims, methods, progress

Aims and methods were discussed with stakeholders in year 1, monitoring protocols agreed and Fishwatch Maldives and Sharkwatch established. During Year 3 we have maintained dialogue with both the private sector (e.g. resort marine biologists) and other programmes, as explained in Section 2.

Activity 1.2. Establish network of survey teams

This is an on-going process and we have continued to seek out and meet with other potential participants throughout the year.

Activity 1.3. Develop protocols for monitoring of fish populations and reef health & produce recording sheets & field data sheets etc

The final protocols were defined by the end of year 1 and have been in operation since that time. The Fishwatch Manual and powerpoint presentations produced in Yr 2 continue to be used, and during Year 3 we also produced a Sharkwatch Manual (Annex 1.4)

Activity 1.4. Training workshops for MRC staff and other participants

MRC project staff were trained in Fishwatch techniques during year 1, and have gone on to train new Dive Centres during Yr 3. Training sessions have been carried for Sun Diving International and staff at Olhuveli Beach & Spa Resort, for the Marine Biology team at Huvafen Fushi and Six Senses Laamu and the marine biologist and dive team at Velassaru.

We helped organise a 2-day training Workshop in September 2012 during which the local Darwin Project team provided training on Fishwatch, Sharkwatch and Fish Landing and Kuoni-IUCN-Seamarc presented photo survey techniques (CPCe) and Bleachwatch. Participants included Olhuveli Resort, Kandooma Resort, One and Only Reethi Rah Resort, Sheraton, Kuramathi Resort and Diva Resorts.

In October 2011 we carried out Fishwatch and Household Survey training at Naifaru, Lhaviyani Atoll (see Report Annex 3.6).

Activity 1.5. Design databases and train MRC staff & other stakeholders

The excel spreadsheets developed in year 1 continue to be used and data entry has proved to be easy and straightforward. Digital photographs are cross-referenced and stored ready for analysis.

Activity 1.6. Data collection / field surveys / data entry

Fishwatch and Sharkwatch surveys have been carried out every few months by Dive Centres and resorts time permits and data submitted on a regular basis throughout the year. The local Darwin Project officers and MRC staff have also carried out Fishwatch during independent survey trips at sites in Noonu, Raa, Baa and Lhaviyani Atolls (October 2011) (see survey report Annex 3.4), Vaavu Atoll (Feb 2012) and Udhafushi, North Male' Atoll (March 2012).

Activity 1.7. Analysis of data and production of report(s)

Fishwatch survey data for groupers was analysed and a separate report (Annex 4.3) and stock analysis produced (Annex 4.4). A number of important findings emerged from this research and provided essential information for the formulation of the Management Plan. The fish abundance surveys showed that high valued species are observed in fewer numbers than the low valued species. High valued species were also observed more in areas where fishing is not allowed, than in areas which are open to fishing.

Year 2 and 3 data for other Fishwatch species has been combined and the report will be available shortly. Further analysis of Sharkwatch data has been carried out and this will be presented as a poster and in the Proceedings of the 12th International Coral Reef Symposium in July 2012 (Annex 5.1).

Activity 1.8. Continued data collection & analysis

Ongoing – see above

Activity 1.9. Management of 'Sharkwatch'

Ongoing – see above

Activity 1.10. Research into grouper spawning aggregations

Investigations into the location of grouper aggregation spawning sites continued prior to and during the Grouper Management Workshop in September 2011. Discussions during the workshop led to agreement being reached on protection of a number of the most important sites. Efforts are now concentrated on carrying out in-situ baseline surveys of these sites at spawning times. Surveys were carried out at sites in Noonu, Raa, Baa and Lhaviyani Atolls in October 2011 (Annex 3.4) and Vaavu Atoll (Feb 2012) (Annex 3.5). More are planned for the coming months.

Output 2: System for long-term monitoring of catch, effort and value of reef fisheries established.

Activity 2.1. Produce daily logbook for reef fishers in collaboration with stakeholders and adapt as necessary

There has been continuing debate within MOFA and between MOFA and the Darwin Project on the subject of fishing logbooks. The reason for this is because of a new system that is being introduced by the Maldives government in response to EU requirements which specify that there have to be 'catch' and 'validation' forms for fish that are exported to the EU. Although compliance within the tuna fishery is the main priority, the Maldives government is aiming for uniformity among all the export fisheries and so both the grouper and aquarium fishery will be brought into line and follow the same system.

The new arrangement requires each company to record catch by species and location and to submit this information to the Fisheries Management Agency (FMA). Prior to export, the company has to submit a 'validation' request to FMA and exports will be permitted only if the number of fish to be exported tallies with the recorded catch. The logbooks devised under the Darwin Project are being slightly modified to fit with these new requirements whilst also providing more detailed information for monitoring purposes (Annex 3.1).

Data collection using the trial daily fishing logbooks designed in year 2 were therefore mostly put 'on hold' because of the anticipated changes described above, and also because of anticipated new reporting requirements under the new Grouper Management Plan. We have, however, had some data from the aquarium fishery which is in the process of being analysed.

During the latter part of the Yr 3, the Darwin Project began investigating the possibility of using 'electronic' rather than paper daily fishing logbooks. We have had in-depth discussions with a commercial software company (Catchlog) that specialises in developing software programmes that monitor catch and marketing of fish. We have supplied them with information to build the programme(s) and will be beginning small trials with the grouper and reef fishery in June/July 2012.

Activity 2.2. Train fishers in data entry

Several training sessions were carried out with the aquarium fishermen during Yr 3 and a few of the companies have gone on to collect daily data, but the response has not been universal. The problem remains that until it becomes mandatory to fill in the log books, then compliance will be weak. It is hoped that the new regulations will bring about a significant change because they require validation of catch before export is allowed. Companies not complying would essentially have to stop trading.

Activity 2.3. Establish databases and train MRC staff in data entry and analysis

Ongoing, see above.

Activities 2.4. & 2.5. Data collection, analysis and production of reports and recommendations

As explained in 2.1. collection of data from daily logbooks has, apart from some preliminary trials, been 'on hold' this year because of complications with regard to the new system of 'catch' and 'verification' that is being developed.

Activity 2.6. Collection and analysis of fishery data

A considerable amount of information on the grouper fishery was collected in the latter part of Year 2 and was supplemented with data collected early in Year 3 (see trip report to Thinadhoo, Annex 3.3). Analysis was carried out in the months running up to the Grouper Management Workshop in Sept 2011.

A number of important findings emerged from this analysis and provided essential information for the formulation of the Management Plan. Collection of data on fish length showed a decrease in mean sizes for key species since the last survey in 2005. In addition, a high proportion of fish being caught were immature (based on theoretical maturity lengths) (Grouper Fishery Review Annex 4.2.).

Activity 2.7. Design and introduce logbooks for 'end users'

There have been previous attempts (prior to the Darwin Project) to obtain information from resorts on fish landings but only a few resorts got involved and there was little follow-up. During Year 3 of the Darwin Project several resorts provided data using the trial versions of the report forms developed in Yr 2.

At the same time we continued to refine the fish landings protocols in conjunction with the private sector and Ministry of Fisheries and Agriculture. During this year we have also developed protocols for collection of data during night fishing trips undertaken by resorts for guests since much of the catch from these trips is kept for later consumption. The protocols and data sheets for fish landing are in Annex 2.1 and for night fishing in Annex 2.2. In summary, aims are as follows:

- Collection of basic data on reef fish/lobsters purchased from fishermen and/or caught by the resort for catering – for every consignment.
- Size sampling data of reef fish/lobsters purchased or caught for the above purpose – survey on 1 consignment per week for reef fish purchased and every consignment of lobsters purchased.
- Species and size sampling undertaken on night fishing trips organized by the resort as a guest activity.

The Ministry of Tourism, Arts & Culture (MOTAC) endorsed this new initiative to collect landings and night fishing data and helped by circulating a letter about the programme to all resorts. We are currently collating replies and distributing the data collection files and protocols.

Another aspect of 'end use' was to carry out household surveys (Annex 2.3) to investigate reef fish consumption patterns. For this work we collaborated with an NGO (Tiny Island) who were based in Lhaviyani Atoll and carried out the survey at the main island Lh Naifaruu. Another household survey was carried out by the Darwin project team, MRC and a local NGO (CHOCO) at Thinadhoo (Gaafu Dhaalu Atoll) (see trip report Annex 3.3).

Activity 2.8. Collect, enter and analyse export data

Further analysis was carried out on the grouper export proformas, in order to bring the records up to date and provide data for the Grouper Management Workshop and Management Plan. An important finding was that the export statistics showed a large decrease in live grouper exports which are higher in value, with a corresponding increase in fresh chilled exports composed of lower valued smaller species.

However, during the analysis, errors in reporting were found for some species. One of the issues was that exports of the important brown-marbled grouper (kas faana) were mistakenly being entered as 'kas' or *Cephalopholis miniata*. In addition some of the *Cephalopholis* species were being assigned to *C. miniata* when in fact they were other species of *Cephalopholis*. When this error was found, meetings and a small workshop were held to discuss and explain the errors and ensure that the exporters realised the importance of entering the data correctly.

Activity 2.9. Design identification guides to reef fish for stakeholders

Guides to reef fish and groupers were completed in Year 2. During Yr 3 we have been revising and updating the aquarium trade export list, which now stands at over 250 species.

In addition, further work was carried out on producing maps in Dhivehi and English (see sample in Annex 3.2)

Activity 2.10. Consultations and fact-finding meetings with fishery stakeholders

Throughout Year 3 we have continued to have one-to-one meetings with fishery stakeholders, including aquarium fishermen, aquarium fish exporters, grouper fishermen, live fish cage owners and fish buyers from resorts. The aim of these meetings has been to gather and exchange information, consolidate relationships and gain an understanding of issues of concern to the various stakeholders. The meetings have been held in Male where possible, but have also involved travel to locations where the fishing is based.

In-depth consultation with grouper fishermen, exporters, fishery managers and enforcement agencies was carried out during the Grouper Management Workshop in September 2011 (see Workshop Report, Annex 4.1. This was followed up with further consultations over the next few months to address specific issues that arose from the Workshop.

Activity 2.11 Seminars / training with Maldives Customs Services (MCS)

Darwin project staff participated in a meeting with the Fisheries Management Agency and MRC staff to discuss changes in the current export procedures as they apply to the aquarium fish trade. The new government regulations require exporters to obtain a catch certificate from the statistics unit of FMA which then has to be shown to Maldives Customs Service before export is permitted.

There was also discussion about further training of Customs staff in species identification. Customs officers suggested that it would be more useful to give training through the Customs Academy to all staff on the focal department rather than a few rotational staff. We are exploring this suggestion and the materials that we need to provide to the Academy for this to be done.

Output 3. Management Plans for coral reef fisheries and biodiversity conservation devised and in operation.

During this year, efforts have focussed on the production of a Grouper Management Plan. The following activities were carried out:

- a) Data collection and research. May to August 2011: continued to gather, analyse and collate data needed for the preparation of a draft Plan, including:
 - o Fishermen interviews to assess fishery status and identify spawning aggregation sites
 - o Size sampling at cages and on fishing trips
 - o Analysis of export data from Ministry of Fisheries and Agriculture (MOFA) statistics
 - o Underwater surveys (Fishwatch) to assess status of grouper populations
- b) Preparation of draft Grouper Fishery Review and draft Management Plan for discussion: August 2011.
- c) Grouper Management Plan Consultative Workshop in Male'. September 2011. See Workshop Report Annex 4.1.
- d) Meetings with the grouper exporters to further discuss proposed size limits Dec 2011 and Jan 2012 (Report: Annex 4.6).
- e) Briefing to Fisheries Advisory Board (Nov 2011) (Annex 4.7) and approval of management measures.
- e) Publication of Final Grouper Fishery Review (Annex 4.2) and Grouper Management Plan (Annex 4.5)
- e) Production of Cabinet Briefing Paper (in Dhivehi, Annex 4.8) containing summary of the review, MP and proposed management measures, with one section detailing all those who were consulted and how this would affect the budget, legal side, stakeholders and community.

After the preparatory work outlined above, the Management Plan and new regulation began its progress through the formal stages and the project team was no longer directly involved, except in an advisory capacity as required. The following steps have already been taken:

- a) Conversion of Management Plan into regulation
- b) Regulation sent to Attorney General for approval and comments.
- c) Presentation of Management Plan to policy makers of MOFA.
- d) Presentation to cabinet and grouper working group.

All the papers are now with the Cabinet and the review process is ongoing. If the Management Plan is approved by cabinet the 'Regulation on Grouper fishing and export of groupers from the Maldives' will be gazetted under Maldives Fisheries Law No. 5/87.

Preparations for production of management plans for the aquarium and reef fish fisheries are continuing with the emphasis on data collection, analysis and stakeholder consultations. Workshops to present and discuss draft management measures are planned for October 2012.

Output 4. Results of reef fish stock assessment and reef health monitoring widely disseminated

The grouper Fishwatch Report (Annex 4.3) was circulated to participating Dive Centres, government departments and other stakeholders and a separate report (*Preliminary analysis of Maldives grouper populations and sustainable yields* Annex 4.4) was produced as ancillary material for the Grouper Fishery Review and Management Plan.

The Fishwatch report covering other species will be available in early June. Sharkwatch data is also being analysed and will be presented at the International Coral Reef Symposium in July 2012.

A poster on Grouper Fishery Management in the Maldives will be presented as a poster at the 12th International Coral Reef Symposium in July 2012 and a paper has been accepted for publication in the Proceedings (Annex 5.3).

3.2 Progress towards Project Outputs

Output 1. Reef fish monitoring programme established and coral reef fish stock assessment / habitat assessment completed.

The reef fish monitoring programme (Fishwatch, Sharkwatch) has continued to run throughout Year 3. In addition, these programmes are being used in the Kuoni-Seamarc-IUCN project which, as described in Section 2 is contributing to the nationwide effort to develop a standard reef monitoring programme and to provide the national government and managers with information about coral reef systems. We are also maintaining close ties with the Wetlands Conservation and Coral Reef Monitoring (WCCM) project which is currently in the development phase and which may incorporate some elements of the Darwin Project's monitoring protocols. This project in turn is contributing towards a long-term coral reef monitoring programme for the Maldives.

Coral reef fish stock assessments are progressing according to plan, as described above (Output 4).

Output 2. System for long-term monitoring of catch, effort and value of reef fisheries established

Three separate fisheries are being addressed under the overall heading of 'reef fisheries'. These are the aquarium fishery (for ornamental species), the grouper fishery (mainly for export) and the 'general' reef fishery which includes snappers, emperors, groupers and others (mainly for consumption in local resorts).

The main tool we have been trying to implement for long-term monitoring of catch and effort is use of daily catch logbooks. Development of the log books began in year 1 but these took longer than anticipated to finalise due to the trialling of more general reef fishing log books by the Ministry of Fisheries and Agriculture (MOFA). The latter are still in use although only a limited amount of data has been collected and this has not yet been analysed.

There have been further delays in the evolution of the daily log books (see Section 2.1. p 8) because of complications with regard to the new system of 'catch' and 'verification' that is being developed. Trials will shortly be underway with the latest logbooks.

Catch data for groupers has been collected this year through surveys at fish cages, and it is likely that these direct surveys by MRC / MOFA staff will always play a part in long-term monitoring.

The protocols for monitoring reef fish landings at resorts have been finalised and recently launched. Resorts are not currently obliged to monitor landings and provide data but the Ministry of Tourism, Arts and Culture has endorsed this programme and requested that tourist facilities fully support and cooperate in this important initiative. The Darwin project will be overseeing implementation and data analysis in this coming year.

Output 3. Management Plans for coral reef fisheries and biodiversity conservation devised and in operation.

Three separate management plans will be produced during the lifetime of the project - grouper fishery, reef fishery and aquarium fishery. The Grouper Fishery Management Plan was completed during Year 3 after extensive research and consultation. The draft plan presented to stakeholders at the Grouper Fishery Workshop recommended management of the fishery through size limits, protection of spawning aggregations and export quotas. However, export quotas were not approved by the Fisheries Advisory Board (composed of policy level representatives from the ministry and members of the industry), so the two management measures submitted for Cabinet approval are size limits and protection of key spawning aggregation sites. The plan promotes adaptive management whereby it will be reviewed annually. This will include a workshop with all stakeholders to discuss scientific data and all relevant issues. Management measures will then be revised if deemed necessary based on the findings of the workshop and studies.

Output 4. Results of reef fish stock assessment and reef health monitoring widely disseminated

The grouper Fishwatch Report (Annex 4.3) was circulated to participating Dive Centres, government departments and other stakeholders and a separate report (*Preliminary analysis of Maldives grouper populations and sustainable yields* Annex 4.4) was produced as ancillary material for the Grouper Fishery Review and Management Plan.

The Fishwatch report covering other species will be available in early June. Sharkwatch data is also being analysed and will be presented at the International Coral Reef Symposium in July 2012.

3.3 Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date
4C	Number of postgraduate students receiving training	0 * see note	0 * see note	0 * see note		0
4D	N° of training weeks	0 * see note	0 * see note	0 * see note		0
6A	Number of people receiving other forms of education/training. Training in underwater fish surveys	6 staff from MRC. 12 x dive team members from Private Sector	4 staff from MRC. 15 x dive team members from Private Sector	16 x dive team members from Private Sector		53
6B	Number of training weeks to be provided	18 x 3d = 11wks	19 x 1d = 5wks	15 x 1d = 3wks		19
7	Number of training materials produced for use by host country	2 Powerpoint presentations; CD of survey protocols	0	0		2
8	Number of weeks spent by UK project staff on project work in the host country	8	6	6		20
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities, or other implementing agencies in the host country	0	0	1 (grouper management plan)		1
10	Number of individual field guides/manuals to be produced to assist work related to species identification, classification and recording	Reef fish ID poster (A1) Illustrated field survey record sheets (x 4 incorporating 70 spp)	Illustrated field guides (laminated A4 sheets) for ID of groupers & other reef fish. Illustrated field survey record sheets (x 2 incorporating c 50 spp)	Grid maps of each atoll to help with plotting of fishing activities		5

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date
11A	Number of papers to be published in peer reviewed journals	0	0	2 (Proceedings International Coral Reef Society Symposium 2012)		2
11B	Number of papers to be submitted to peer reviewed journals	0	0	0		0
12A	Number of computer based databases to be established and handed over to host country	4 Fish survey results; grouper exports; aquarium fish exports;	0	2 Fish landings and night fishing data		6
14A	Conferences/seminars/workshops organised to present/disseminate findings	0	0	1 (Grouper Management Plan Workshop)		1
14B	N ^o of conferences/seminars/workshops attended at which findings from Darwin project work presented/disseminated.	2	1	1 (6 th International Fisheries Congress)		4
15A	Number of national press releases in host country(ies)	0	0	0		0
15C	Number of national press releases in UK	0	0	0		0
17A	Number of dissemination networks established	0	1	0		1

- Re 4C & 4D, these measures were included in the original proposal because it was anticipated that the two staff who joined the project would be graduates. In the event they were not, and so their training is included in 6A.

Table 2 Publications

Type (eg journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Information leaflet	Darwin Reef Fish Project	MCS/MRC		0 but See note 1
Information leaflet	Fishwatch Maldives	MCS/MRC		0
Field identification sheets for fish	Fishwatch Maldives fish survey sheets	MCS/MRC		0
Reef monitoring manuals	Fishwatch and Sharkwatch Manuals	MCS/MRC		0
Fish use monitoring manuals	Resort fish landings protocols Night fishing data collection protocols & data sheets Household surveys questionnaire	MCS/MRC		0
Poster	Reef fish	MRC		0
Powerpoint presentations	Fishwatch Maldives Darwin Reef Fish Project	MCS/MRC		0
Report	Sharkwatch	MCS/MRC		0
Report	Grouper Workshop Report 2011			
Report	Maldives Grouper Fishery Review 2011	MCS/MRC	MCS website	0
Report	Fishwatch: grouper report	MCS/MRC		0
Report	Grouper populations & sustainable yield	MCS/MRC		0
Management Plan	Grouper Management Plan	MCS/MRC	MCS website	0
Publication Proceedings of the International Coral Reef Symposium	Maldives Sharkwatch Report: M. Ushan, E Wood, M Saleem, S Sattar 2012	MCS/MRC		0
Publication Proceedings of the International Coral Reef Symposium	Management of the grouper fishery of the Maldives. S. Sattar, A Najeeb, F. Islam, M. Shidha Afzal, E. Wood 2012	MCS/MRC		0
Educational colouring book	The adventures of Anees the Anemonefish	MCS/MRC		0
Magazine article	Taking stock and taking action on Maldives reef fisheries	MCS/MRC		0

Note 1. Digital copies provided. Hard copies for all items available at cost price of printing and postage

MCS website: http://www.mcsuk.org/conservation_in_action/Coral+reefs/Maldives/Maldives

3.4. Progress towards the project purpose and outcomes

The project purpose is to establish a long-term monitoring and evaluation programme that provides data for the development of a conservation management plan for Maldives coral reef fisheries. Three main outcomes are expected by the end of the project.

- a) Coral reef fish monitoring programme established and functioning.

The framework for this was established in Yr 1 through the development of 'Fishwatch Maldives', which is an underwater recording scheme involving Dive Centres and Marine Labs throughout the country. We are also co-ordinating 'Sharkwatch', the aim of which is to determine how shark populations respond to the fishing ban introduced in 2009. Both these schemes are progressing according to plan and surveys have been conducted throughout the year with breaks at busy times when staff time may be limited. The report on analysis of grouper distribution and abundance (Annex 4.3) provided valuable information which helped in the formulation of the Grouper Management Plan.

- b) System for recording catch and effort in place and operating

As explained in Section 3.1., introduction of the daily log book system for recording catch and effort has gone more slowly than anticipated due partly to policy changes within the Ministry. However, following continued stakeholder consultation and discussions with the Fisheries Management Agency, the latest and final versions of the logbooks are ready to be launched. In addition, we are initiating a trial with electronic logbooks for the grouper fishery which could, if successful, revolutionise the way that data is collected and analysed. Information on catch and effort was also recorded through fishing surveys, with data collection by the MRC project staff. This work will continue as part of the system for corroborating log book data.

- c) Management plans for coral reef fisheries produced and implemented

A review of the Maldives Grouper Fishery has been completed and this led directly to the production of the Maldives Grouper Management Plan. The proposed '*Regulation on grouper fishing and export of groupers from the Maldives*' has been submitted to the Attorney General's Office and will hopefully be incorporated into Fisheries Law within the next month or so. Work on Management Plans for the Aquarium and Reef Fisheries is continuing.

3.5. Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

The goal for the project is for all types of reef fisheries in the Maldives to be carried out at a sustainable level. Production of the Grouper Management Plan and the new Regulation on grouper fishing and export is a significant step in the right direction. We are continuing to work towards a similar outcome for the other fisheries.

Implementation of management measures for reef fisheries should have positive benefits for biodiversity but it is uncertain at this stage whether these will show up in the relatively short time-frame of the project.

4. Monitoring, evaluation and lessons

Project progress is monitored against the targets set in the implementation timetable and indicators in the logframe. This overall plan is used to guide activities and ensure that we are making progress towards the project goals. The Annual Review has assisted us in evaluating where there are gaps and where emphasis should be placed in the final year of activities. Lessons learnt are largely covered in Section 7 below and relate to the importance of designing our programmes so that they have a life-time beyond the end of the project and will contribute directly to long-term monitoring programmes.

5. Actions taken in response to previous reviews (if applicable)

Action was taken in response to the Yr 1 annual review and covered fully in the half-year report (October 2010). No other additional issues have been raised.

6. Other comments on progress not covered elsewhere

No additional comments.

7. Sustainability

We believe that there are several factors that will be the key to long-term sustainability and legacy of the Darwin project:

a) Continuing involvement of the private sector in reef and fishery monitoring

The Maldives is highly dependent on its marine resources for the two mainstays of its economy – fisheries and tourism. However, there is very limited capacity within the public sector to monitor marine resource use and ecosystem health. Only a very small number of reef sites can be included in the annual monitoring programme carried out by the Marine Research Centre and this situation is unlikely to change in the foreseeable future due to financial and staffing constraints.

One of the main aims of the Darwin project is to encourage the private sector to contribute to more broad-scale monitoring of reefs and reef resources and to adopt and carry forward these volunteer programmes. It is especially important that this type of approach becomes an accepted part of the everyday operations of resorts and dive centres.

The main challenges are that a) marine biologists and dive centre staff are not always able to find enough time to engage in conservation programmes because of their commitments to guests b) there is quite a rapid turn-over of marine biologists and dive centre staff which can disrupt monitoring programmes and c) the level of engagement often depends on the attitude of the resort management – some are more supportive than others and some concentrate more on their own projects such as coral propagation or turtle protection.

The Kuoni-Seamarc-IUCN and Wetlands Conservation and Coral Reef Monitoring projects are also encouraging the private sector and local communities to get involved in data collection and monitoring. Hopefully there will be growing awareness by the private sector of the significant and essential role they can play in helping to monitor the health of the reef on which their future livelihoods depend.

b) Continued support and coordination within the Marine Research Centre (MRC)

Currently, coordination of the public sector monitoring programmes and engagement with stakeholders (see d below) is being carried out by Darwin Initiative staff within MRC together with a consultant employed by the project and also with assistance from other MRC staff. If collaboration with resorts on reef monitoring and other data collection is (as planned) to continue beyond the lifetime of the project then MRC will need to assign or appoint a member of staff to coordinate the programme.

c) Enforcement of reef fishery regulations

The Maldives reefs cover an area of 4,513km² and this presents a huge challenge for agencies responsible for enforcing fishery regulations at sea. The Ministry of Fisheries and Agriculture does not have patrol boats which means that compliance will largely be a case

of self-regulation by the industry itself and also by the tourism sector, which guards its own reefs and also reports infringements in Marine Protected Areas.

It is possible that, some time in the future, vessels engaged in reef, grouper and aquarium fishing will be tracked remotely but currently this is not an option. It is hoped however that Atoll Councils will play an increasingly important role in monitoring fishing activities in their area and that local fishery officers will be employed to make checks on fish that are landed. These activities will require commitment and financial investment by the government.

Enforcement of regulations at the point of export or local use (e.g. at resorts) should be easier to implement, especially if the new system for validating catch against export can be successfully implemented.

d) Engagement of reef fishermen and traders

Given the difficulties of enforcement at sea, it is clear that the behaviour of the fishermen themselves will largely determine the success of the proposed management measures such as protection of grouper spawning aggregations. If the fishermen remain engaged with the management processes and decide that it will be beneficial to adhere to the agreed regulations, then the chances of sustainable management measures being successfully implemented will be significantly enhanced. We will be expanding our awareness and outreach activities with fishermen and local communities in an effort to promote better understanding about fishery issues and the steps that are being taken to ensure sustainability of stocks and livelihoods.

8. Dissemination

Information about the project and its aims and activities continues to be disseminated at training courses, stakeholder meetings (including the Grouper Management Workshop) and during fishery survey trips. Fishwatch and Sharkwatch results have been circulated to participating dive centres and resorts and other interested parties, and the Grouper Fishery Review is available on the MCS website, along with other project information. A feature about the project was published in the MCS magazine '*Marine Conservation*' in spring 2011 (Annex 5.5). The educational colouring book has helped us to reach out to local schoolchildren and highlight some of the ways that everyone can help to take care of the Maldives coral reefs and their natural resources.

Project Expenditure

Table 3 Project expenditure during the reporting period (Defra Financial Year 1 April 2008 to 31 March 2010)

Item	Budget	Expenditure	Variance/ Comments
Staff costs specified by individual*			
Overhead costs			
Travel and subsistence			
Operating costs			
Capital items/equipment (specify)			
Others: Consultancy			
Others **			
TOTAL			

* E Wood ; J. Miller Clare Perez S Sattar M Ushan A Najeeb

** Including: Production of monitoring and data collection survey sheets, underwater camera for MRC team and other miscellaneous items for field work. T-shirts, banner, notebooks and other materials for Grouper Workshop; website maintenance; registration fees for International Coral Reef Symposium for M. Ushan & A. Najeeb, insurance, external hard drives

9. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

Photographs are available of fisheries in operation, underwater surveys taking place and fish in situ on the reef.

Report of progress and achievements against Logical Framework for Financial Year: 2011-2012

Project summary	Measurable Indicators	Progress and Achievements April 2011- March 2012	Actions required/planned for next period
<p>Goal: Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.</p>			
<p>Sub-Goal: Harvesting of coral reef fish in the Maldives for the aquarium trade and for food are set at a sustainable level that promotes conservation of biodiversity, retains ecosystem function and provides maximum benefits to local communities.</p>	<p>In-situ surveys in fished and un-fished areas show no significant differences in reef health and populations of target species. Catch/unit effort for target species is stable</p>	<p>Data from the field surveys DI Project evaluation</p>	
<p>Purpose The Project purpose is to establish a long-term monitoring and evaluation programme that provides data for the development of a conservation management plan for Maldives coral reef fisheries</p>	<ol style="list-style-type: none"> 1. Coral reef fish monitoring programme established and functioning by end of Project. 2. System for recording catch and effort in place and operating. 3. Management plan (s) for coral reef fisheries produced and implemented by end of Project. 	<p>Fishwatch (coral reef fish monitoring programme) has continued throughout Yr 3. The systems for recording catch and effort are continuing to be tested, adjusted and developed to try and ensure that they are workable for the fishermen and provide sufficient data for management. The Grouper Fishery Management Plan has been completed and is currently awaiting review by the Cabinet.</p>	<p>Monitoring will continue in order to provide data to feed into the Management plans. In order to promote legacy and sustainability, we will continue to discuss protocols and integration with other initiatives currently running or being developed - for example the Maldives National Coral Reef Monitoring Programme. Management plans for the aquarium and reef fisheries will be developed in consultation with stakeholders.</p>

Project summary	Measurable Indicators	Progress and Achievements April 2011- March 2012	Actions required/planned for next period
<p>Output 1.</p> <p>1. Reef fish monitoring programme established and coral reef fish stock assessments / habitat assessments completed</p>	<p>1.1. Volunteer data collectors sustain interest and provide good quality data from surveys by yr 2 and on-going until end of project.</p> <p>1.2. Data from surveys analysed annually from yr 2 and results disseminated to volunteer data collectors and other stakeholders.</p> <p>1.3. Results of all surveys combined and incorporated into pilot fishery management plan early in Yr 3 and final management plan by end of project.</p> <p>1.4. Data on grouper spawning aggregations incorporated into management decisions and plans by early in year 3.</p>	<p>Data collection has continued throughout the year for Fishwatch and Sharkwatch. Emphasis has been placed during this year on analysis of Fishwatch grouper data as this was needed for the Grouper Management Plan. Information on abundance, distribution and biomass of key grouper species was incorporated into the Plan and surveys are currently being carried out to investigate/validate reported grouper spawning aggregation sites.</p> <p>A paper on Sharkwatch has been accepted as a poster and for publication in the Proceedings of the 12th International Coral Reef Symposium to be held in Australia, July 2012.</p>	
<p>Activity 1.1.</p> <p>Stakeholder meetings to discuss aims, methods, progress</p>		<p>Discussions with stakeholders from the fishery, government, NGOs and private sector has continued throughout the year (see Section 2).</p>	
<p>Activity 1.2.</p> <p>Establish network of survey teams</p>		<p>Work has continued throughout the year to recruit more dive centres and build up the survey teams.</p>	
<p>Activity 1.3.</p> <p>Develop protocols for monitoring of fish populations and reef health & produce recording sheets & field data sheets etc</p>		<p>The protocols developed in Yr 1 continue to be used, with a few minor modifications / improvements. Manuals explaining the protocols are provided to all participants, along with the suite of data entry files.</p>	
<p>Activity 1.4.</p>		<p>MRC and MCS have carried out additional training sessions for new</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2011- March 2012	Actions required/planned for next period
Training workshops for MRC staff and other participants		participants.	
Activity 1.5. Design databases and train MRC staff & other stakeholders		The excel spreadsheets developed in year 1 have been used successfully throughout the year.	
Activity 1.6. Data collection / field surveys / data entry		Data collection and entry has been on-going throughout Yr 3	
Activity 1.7. Analysis of data and production of report(s)		Analysis of Fishwatch grouper data has been completed and key findings incorporated into the Grouper Management Plan. The Fishwatch results for other species has also been analysed and is in a separate report currently being finalised.	
Activity 1.8. Continued data collection & analysis Yr 4		This activity is scheduled for Year 4	
Activity 1.9. Management of 'Sharkwatch'		This has continued throughout year 3	
Activity 1.10 Research into spawning aggregations		Investigations into the location of grouper aggregation spawning sites continued prior to and during the Grouper Management Workshop in September 2011. Several in-situ surveys of these sites have already been carried out at spawning times to obtain baseline data.	
Output 2.	2.1. Fishers participate in the log book scheme and provide reliable data from yr 2 and on-	The log book scheme is ongoing and some results have been obtained for the aquarium fishery. There has however been continued debate over the	

Project summary		Measurable Indicators	Progress and Achievements April 2011- March 2012	Actions required/planned for next period
System for long-term monitoring of catch, effort and value of reef fisheries established.	<p>going until end of project.</p> <p>2.2. Data from fisher log books analysed and results incorporated into the fishery management plans.</p> <p>2.3. Data from log books and surveys of 'end use' analysed and incorporated into fishery management plans.</p>	<p>daily fishing logbooks because of new regulations that require 'catch and validation' information prior to export. Further adjustments are being made to the logbooks to accommodate these requirements.</p> <p>Further data on fish length at capture has been collected from fish cages and the results incorporated into the Grouper Fishery Review and Management Plan.</p>		
Activity 2.1. Produce daily logbook for reef fishers in collaboration with stakeholders; and adapt as necessary, based on feedback.			Further modifications have been made to the logbooks to incorporate new policy that requires 'catch and validation' information prior to export.	
Activity 2.2. Train fishers in data entry.			Several training sessions were carried out with the aquarium fishermen during Yr 3	
Activity 2.3. Establish databases and train MRC staff in data entry and analysis			This activity is ongoing, alongside the development of the updated logbooks	
Activity 2.4. Data collection			Aquarium log book data has been collected; data collection for the other fisheries is pending while the log books are being finalised.	
Activity 2.5. Data analysis and production of reports and recommendations			Pending – currently we have insufficient log book data for analysis due to the ongoing changes	

Project summary	Measurable Indicators	Progress and Achievements April 2011- March 2012	Actions required/planned for next period
Activity 2.6. Collection and analysis of fishery data		Data (mainly from grouper cages) collected during Yr 2 and early in Year 3 analysed and the results incorporated into the Grouper Fishery Review and the Grouper Management Plan.	
Activity 2.7 Design and introduce logbooks for 'end users'		Protocols and data record sheets for fish landings were finalised in Year 3 and are in use at several resorts.	
Activity 2.8. Collect, enter and analyse export data		Proforma export forms for aquarium species and for groupers are collected by Customs and passed to MRC for data entry and analysis. This activity has continued throughout Year 3 by the two Darwin project officers.	
Activity 2.9. Develop identification guides to reef fish for stakeholders		Guides to reef fish and groupers were completed in Year 2. During Yr 3 the aquarium trade export list has been revised and updated and now stands at over 250 species.	
Activity 2.10. Consultations and fact-finding meetings with fishery stakeholders		Further meetings held during Yr 3 with aquarium fishermen, aquarium fish exporters, grouper fishermen, live fish cage owners and fish buyers from resorts. The aim of these meetings has been to discuss progress and gather additional information on the fisheries. In addition, in-depth discussions were held at the Grouper Management Workshop.	
Activity 2.11. Seminars with Maldives Customs Services		Meetings were held with MCS re further training and, once the new regulations have been finalised this will be carried out for the Customs Academy for all staff in the focal department rather than a few rotational staff.	

Project summary	Measurable Indicators	Progress and Achievements April 2011- March 2012	Actions required/planned for next period
<p>Output 3.</p> <p>Management Plans for coral reef fisheries and biodiversity conservation devised and in operation</p>	<p>3.1. Draft management plans produced by end of Yr 3</p> <p>3.2. Revised management plans produced by end of Yr 4</p> <p>3.2. Management measures introduced on the ground by end Yr 4.</p>	<p>Work has focussed on the Management Plan for the Grouper Fishery. A draft was produced for the Stakeholder Workshop in Sept 2011 and was finalised after further stakeholder consultations and submitted to the Cabinet in May 2012.</p> <p>Preparations for production of management plans for the aquarium and reef fish fisheries continued. Workshops to present and discuss draft management measures are planned for October 2012.</p>	
<p>Activity 3.1.</p> <p>Draft management plans produced by end of Yr 3</p>		<p>See above</p>	
<p>Activity 3.2.</p> <p>Revised management plans produced by end of Yr 4.</p>		<p>The final draft of the Grouper Management Plan was produced in Yr 3 – ahead of schedule. Plans for the other fisheries will be produced in Yr 4.</p>	
<p>Activity 3.3.</p> <p>Management measures introduced on the ground by end Yr 4</p>		<p>This activity is scheduled for Year 4</p>	
<p>Output 4.</p> <p>Results of reef fish stock assessment and reef health monitoring widely disseminated.</p>	<p>4.1. Website established.</p> <p>4.2. Workshops with stakeholders.</p> <p>4.3. Articles and scientific papers prepared.</p> <p>4.4. Data shared with global databases</p>	<p>Project information is included in the MCS website. Articles and scientific papers have been prepared (see ‘publications’ p.16).</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2011- March 2012	Actions required/planned for next period
Activity 4.1. Website established		Project information is at http://www.mcsuk.org/conservation_in_action/Coral+reefs/Maldives/Maldives	
Activity 4.2. Workshops with stakeholders		Grouper Management Plan Workshop held in Yr 3, together with follow-up consultations and further focus group meetings for the other fishery stakeholders.	
Activity 4.2. Articles and scientific papers prepared		Several papers and articles published (see publications, p.16)	
Activity 4.3. Data shared with global databases		Deferred to Yr 4	

Project's full current logframe: Please note this is the logframe revised in October 2010

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal:</p> <p>Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.</p>			
<p>Sub-Goal:</p> <p>Harvesting of coral reef fish in the Maldives for the aquarium trade and for food are set at a sustainable level that promotes conservation of biodiversity, retains ecosystem function and provides maximum benefits to local communities.</p>	<p>In-situ surveys in fished and unfished areas show no significant differences in reef health and populations of target species.</p> <p>Catch/unit effort for target species is stable</p>	<p>Data from the field surveys</p> <p>DI Project evaluation</p>	
<p>Purpose</p> <p>The Project purpose is to establish a long-term monitoring and evaluation programme that provides data for the development of a conservation management plan for Maldives coral reef fisheries</p>	<ol style="list-style-type: none"> 1. Coral reef fish monitoring programme established and functioning by end of Project. 2. System for recording catch and effort in place and operating. 3. Management plan (s) for coral reef fisheries produced and implemented by end of Project. 	<ol style="list-style-type: none"> 1. Reports of workshops 2. Monitoring reports 3. Fishing log books 4. Management plan(s) 5. Fishing log books 	

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Outputs</p> <p>1. Reef fish monitoring programme established and coral reef fish stock assessments / habitat assessments completed</p>	<p>1.1. Volunteer data collectors sustain interest and provide good quality data from surveys by yr 2 and on-going until end of project.</p> <p>1.2. Data from surveys analysed annually from yr 2 and results disseminated to volunteer data collectors and other stakeholders.</p> <p>1.3. Results of all surveys combined and incorporated into pilot fishery management plan early in Yr 3 and final management plan by end of project.</p> <p>1.4. Data on grouper spawning aggregations incorporated into management decisions and plans by early in year 3.</p>	<p>1. Discussion papers.</p> <p>2. Manual defining protocols.</p> <p>3. Illustrated field guides for participants.</p> <p>4. Report(s) of training workshops.</p> <p>5. Report(s) of research seminars</p> <p>6. Databases containing field data.</p> <p>7. Reports containing results, analysis and recommendations for conservation / fishery action (first report end Yr 2).</p>	<p>1. All stakeholders support and become involved in the reef monitoring programme</p> <p>2. Trained staff and volunteers continue to use skills provided under the project</p>

Project summary	Measurable Indicators	Means of verification	Important Assumptions
2. System for long-term monitoring of catch, effort and value of reef fisheries established.	<p>2.1. Fishers participate in the log book scheme and provide reliable data from yr 2 and on-going until end of project.</p> <p>2.2. Data from fisher log books analysed and results incorporated into the fishery management plans.</p> <p>2.3. Data from log books and surveys of 'end use' analysed and incorporated into fishery management plans.</p>	<p>1. Log books.</p> <p>2. Reports of training workshops and meetings.</p> <p>3. Databases containing field data</p> <p>4. Reports of findings and recommendations.</p>	<p>1. Fishers are cooperative and participate fully.</p> <p>2. Trained staff are committed to carrying out data collection and analysis</p>
3. Management Plans for coral reef fisheries and biodiversity conservation devised and in operation	<p>3.1. Draft management plans produced by end of Yr 3</p> <p>3.2. Revised management plans produced by end of Yr 4</p> <p>3.3. Management measures introduced on the ground by end Yr 4.</p>	<p>1. Report of management planning workshops and meetings.</p> <p>2. Final Management Plans for reef fish, grouper and aquarium fish produced.</p> <p>3. Recorded evidence of management measure in place and operational</p>	<p>1. Agreement on management is reached by all the stakeholders</p> <p>2. National government backs and implements the Management Plan(s)</p>

Project summary	Measurable Indicators	Means of verification	Important Assumptions
4. Results of reef fish stock assessment and reef health monitoring widely disseminated	4.1. Website established. 4.2. Workshops with stakeholders. 4.3. Articles and scientific papers prepared. 4.4. Data shared with global databases	1. Website 2. Electronic and hard copies of articles & reports	

Project implementation timetable showing the key milestones in project activities. Please note that many of the activities (e.g. data collection from fish monitoring programme) are continual.

Activity	Months	Year 1				Year 2				Year 3				Year 4			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Output 1. Reef fish monitoring programme established and coral reef fish stock assessments / habitat assessments completed.																	
1.1 Stakeholder meetings to discuss aims, methods, progress		x	x		x		x		x		x		x		x		x
1.2 Establish network of survey teams			x				x				x						
1.3 Develop protocols for monitoring of fish populations and reef health & produce recording sheets & field data sheets etc			x				x				x						

Activity	Months	Year 1				Year 2				Year 3				Year 4			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1.4 Training workshops for MRC staff and other participants				x			x		x			x		x			
1.5. Design databases and train MRC staff & other stakeholders				x					x								
1.6 Data collection / field surveys / data entry					x	x	x	x	x	x	x	x	x	x	x	x	x
1.7 Analysis of data and production of report(s)										x							x
1.8. Continued data collection and analysis						x	x	x	x	x	x	x	x	x	x	x	x
1.9. Management of 'Sharkwatch'			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
1.10 Research into spawning aggregations					x	x	x	x	x	x	x	x	x	x	x	x	x
Output 2: System for long-term monitoring of catch, effort and value of reef fisheries established.																	
2.1 Produce daily logbook for reef fishers in collaboration with stakeholders; and adapt as necessary, based on feedback.		x	x					x			x						
2.2 Train fishers in data entry by Yr 1.				x	x			x									
2.3 Establish databases and train MRC staff in data entry and analysis by Yr 1.				x	x												

Activity	Months	Year 1				Year 2				Year 3				Year 4			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2.4	Data collection in operation by Yr 2.					x	x	x	x	x	x	x	x	x	x	x	x
2.5	Analyse data and produce reports and recommendations by Yr 2/3							x	x	x							
2.6.	Collection and analysis of fishery data.			x	x	x	x	x	x	x	x	x	x	x	x	x	x
2.7.	Develop & implement logbooks for 'end users' ; analyse data				x	x	x	x	x	x	x	x	x	x	x	x	x
2.8.	Collection, entry & analysis of export data				x	x	x	x	x	x	x	x	x	x	x	x	x
2.9.	Identification guide to reef fish for stakeholders				x		x		x								
210	Consultations and fact-finding meetings with fishery stakeholders				x		x		x		x		x		x		
211	Seminars with Maldives Customs Services			x				x				x					
	Output 3: Management Plans for coral reef fisheries and biodiversity conservation devised and in operation.																
3.1	Produce draft management plans by end of Yr 3											x	x	x			

Activity	Months	Year 1				Year 2				Year 3				Year 4						
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
3.2	Produce revised management plans by end of Yr 4																	x	x	x
3.3	Management measures introduced on the ground by end Yr 4																	x	x	x
	Output 4: Results of reef fish stock assessment and reef health monitoring widely disseminated.																			
4.1	Establish website	x	x																	
4.2	Prepare articles and scientific papers				x				x				x							x
4.3	Share data with global databases								x				x							x

Onwards – supplementary material (optional but encouraged as evidence of project achievement)

1. Reef Monitoring Protocols
 - 1.1. Bleachwatch
 - 1.2. CPCe monitoring
 - 1.3. Fishwatch
 - 1.4. Sharkwatch
2. Fish use monitoring
 - 2.1. Resort fish landings protocols & data collection sheets
 - 2.2. Night fishing data collection protocols & data sheets
 - 2.3. Household surveys questionnaire
3. Fish catch monitoring
 - 3.1. Fishery logbooks
 - 3.2. Fishery maps
 - 3.3. Field survey report: Thinadhoo
 - 3.4. Field survey report: Noonu, Raa, Baa and Lhaviyani Atolls
 - 3.5. Field survey report: Vaavu Atoll
 - 3.6. Report of training at Naifaru, Lhaviyani Atoll
4. Grouper fishery Workshop & Management Plan
 - 4.1. Grouper Workshop Report
 - 4.2. Maldives Grouper Fishery Review
 - 4.3. Fishwatch Report 1: Preliminary study on the population status of groupers in the Maldives.
 - 4.4. Preliminary analysis of Maldives grouper populations and sustainable yields
 - 4.5. Maldives Grouper Management Plan
 - 4.6. Report of Grouper Exporter consultation meeting
 - 4.7. Fisheries Advisory Board briefing
 - 4.8. Cabinet briefing paper
5. Other publications
 - 5.1. Sharkwatch Report
 - 5.2. Sharkwatch paper for ICRS Proceedings
 - 5.3. Grouper Management paper for ICRS Proceedings
 - 5.4. Coral reef Colouring Book: *The Adventures of Anees the Anemonefish*
 - 5.5. Article in MCS Magazine: *Taking stock and taking action on Maldives reef fisheries.*