



Darwin Initiative Annual Report

Darwin Project Information

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| 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 |
| 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 and annual report number | 1 st April 2010 to 31 st March 2011 Annual Report N ^o 2 |
| 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, May 2011 |

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.

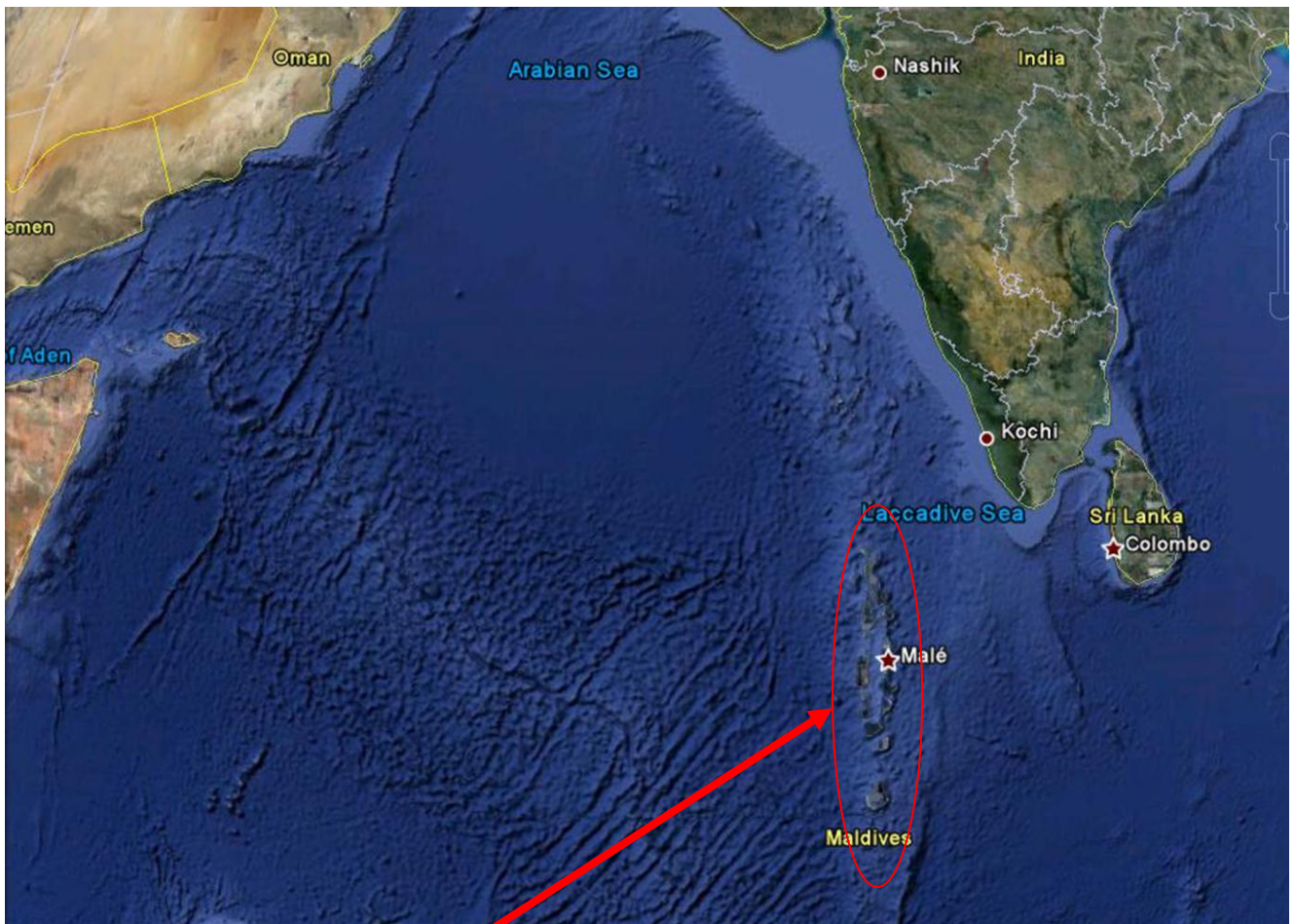
One of the attractions of the Maldives as a tourist destination is the opportunity to see healthy populations of a wide variety of coral reef fish. Apart from this indirect value, coral reef fish are of direct fishery value. At least 70 species of reef and reef-associated species are targeted for food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

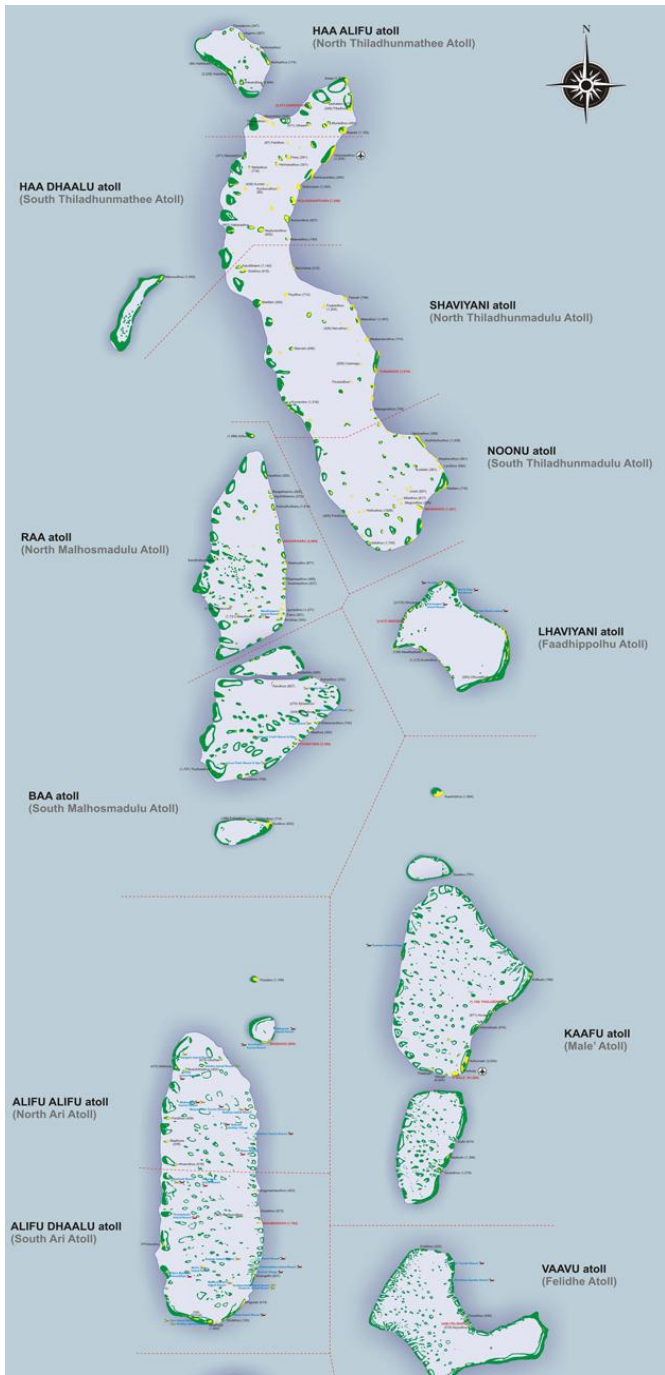
well understood and says that survey and management of reef fish resources is critically important.

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.

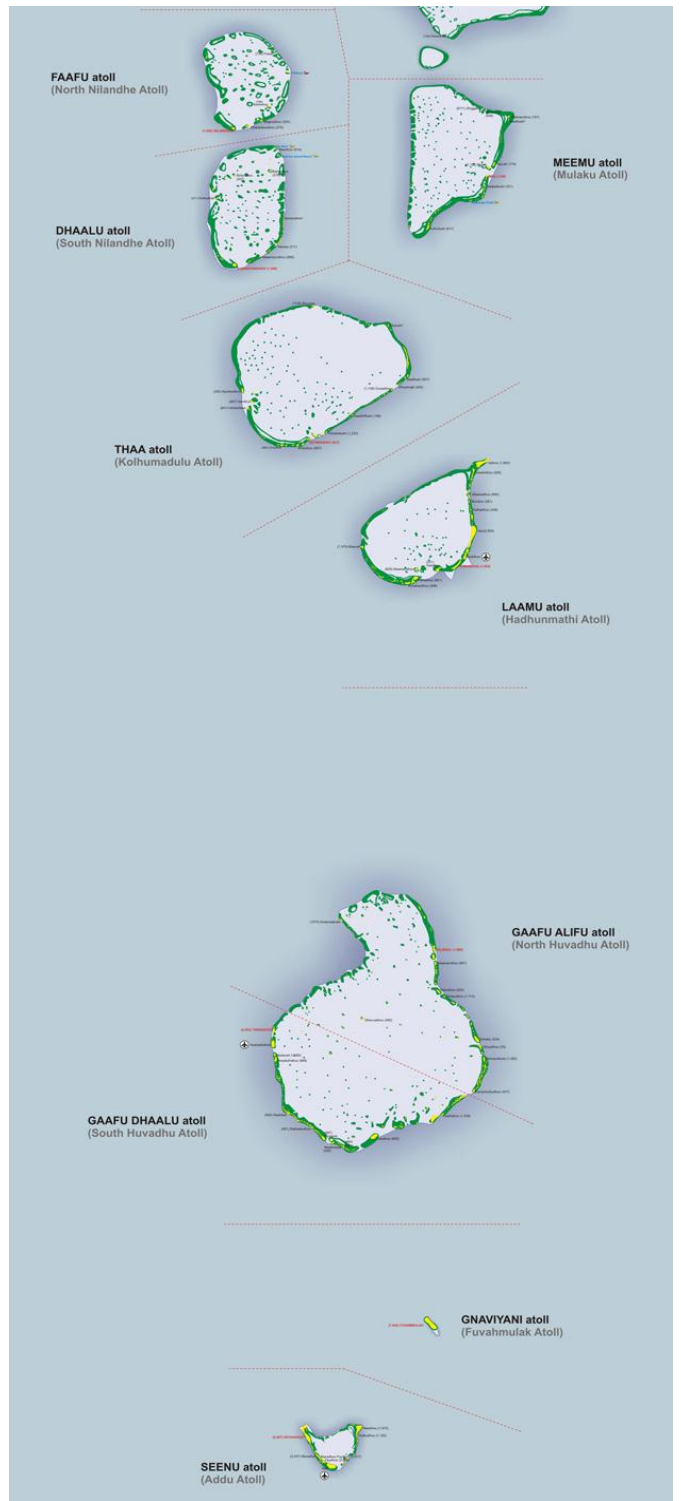
The project seeks to carry any of these actions forward and to ensure that reef fisheries in the Maldives are sustainable. The aim is to ensure that food security is guaranteed into the future, biodiversity is protected and the reefs continue to attract visitors and support the tourist industry.



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 and local co-ordinator at MRC is Shahaama Abdul Sattar, a fisheries biologist employed by MRC who is in charge of the research programme into the grouper and reef fish fisheries.

MCS and MRC work closely on the project and manage it jointly. The core team comprises the project manager from MCS (Elizabeth Wood) the project counterpart from MRC (Shahaama Sattar), 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 two project staff and local counterpart 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 have assisted with project activities as the need arises, especially on field trips when a team of at least four people are needed to collect fishery data. In these cases, subsistence and field allowances have been provided through the DI project.

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. These partnerships are being built up one-by-one and the response has continued to be positive.

The project is continuing to collaborate closely with fishermen, fish traders and exporters in both the aquarium trade and food sectors. Our aim is to ensure that these stakeholders are fully involved in all aspects of the project. They have an extensive knowledge of the reef fishery resources and we hope will play a key role in the development of the proposed management plans for the fisheries. We have had further meetings with the aquarium fishery companies, particularly with regard to the design and introduction of the catch log books but also to hear their views about aspects such as export quotas and the status of stocks in the wild.

Other Collaboration

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

Ministry of Fisheries and Agriculture (MOFA)

We have had regular meetings with MOFA mainly to discuss project progress, fishery logbooks and the grouper management plan.

Environmental Protection Agency

One of the responsibilities of the EPA is to promote and monitor Marine Protected Areas in the Maldives. Most of the MPAs are rich fish sites and there have been some reports of encroachment by fishermen due to lack of enforcement. We had a meeting with the EPA to discuss this matter and the need to raise awareness of the location and function of the MPAs so that fish populations can be better protected.

Maldives National Defence Force and Marine Police

Separate meetings were held with the MNDF and Marine Police to inform them about the objectives and activities of the Darwin Reef Fish Project and learn about their roles in policing fishing activities and marine protected areas. Whilst their priorities lie more with offences relating to immigration and crime, both agencies may take action if they are alerted to fishery misdemeanours. They do not actively patrol MPAs or inspect catches but might be in a position to help monitor and enforce reef fishery regulations provided they were fully briefed on these matters. This is important in relation to the planned implementation of fishery management plans.

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 Reef Project has had an input into the design of some of the protocols for monitoring coral reef ecosystem health, including fish populations, and we are continuing to collaborate 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.

The Darwin Reef Fish Project is also collaborating and sharing information with regard to the development of the coral reef health framework initiated under MEMP in 2009/2010. A proposal for Phase 2 of the MEMP programme is to be submitted for funding to the Maldives Climate Change Trust Fund.

Atoll Ecosystem Conservation (AEC) project: This is a Global Environment Facility (GEF) co-financed project, implemented by the United Nations Development Program (UNDP) and executed by the Ministry of Housing, Transport and Environment (MHTE) in the Maldives. AEC is focussing on conservation and sustainable use of globally significant biological diversity in Baa Atoll and aims to establish a model system to conserve biodiversity through innovative national-local and public-private partnerships. Creation of a Biosphere Reserve in the area is high on the agenda. Our Reef Survey Project Officer attended a meeting of the Baa Atoll Project in October 2010 and gave a presentation about Fishwatch which resulted in several resorts expressing interest in participating in the scheme.

Live and Learn Foundation

Live and Learn Foundation is an international NGO with an office in the Maldives. They concentrate in particular on education, outreach and capacity building and have a programme area called 'sustainable use of biodiversity'. Following a constructive meeting, it was agreed that we would collaborate in particular on an initiative to increase awareness amongst grouper fishermen of the benefits and importance of taking steps to manage the fishery. This is quite critical because some of the grouper fishermen are currently not convinced of the need for management measures.

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. Dr Solandt ran a training course at Bandos in October 2010 which means they now have the capacity to organise their own Reef Check survey programme.

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 2 we have continued to discuss the format and progress of the monitoring programme both with existing and potential Dive Centre / Marine Lab participants. We are also maintaining dialogue with the MEMP programme to ensure that the data we collect will help to feed into the national monitoring data set.

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.

As explained in the Yr 1 Annual Report, some Dive Centres do not have the time or capacity to engage in Fishwatch because the first priorities for the staff are to look after the needs of their guests. Despite this, we have had positive responses from several additional resorts and dive centres and have obtained data from the far north to the far south of the country.

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 throughout this current year. A more detailed Fishwatch Manual was produced in year 2 together with powerpoint presentations covering both Fishwatch and the background and aims of the Darwin Reef Fish Project – see *Annex a) Fishwatch information for participants*. Copies of these presentations are given to all participating Dive Centres.

During on-going discussions with participants it became clear that there is potential for developing survey sheets geared specifically towards snorkelers and also towards Dive Schools that have limited time available but might be able to carry out a simplified version of Fishwatch. Additional survey sheets have therefore been developed for these purposes which include easy-to-identify indicator species – see *Annex b) Fishwatch snorkeller and Fishwatch 2*. These surveys are designed to use exactly the same methodology as the advanced Fishwatch, but feature a selected set of species that in both cases fit onto a single page. The snorkeller surveys will be useful in obtaining data from shallow water and *Fishwatch 2* will expand the survey to new participants. Another aim is to generate interest in ‘fish spotting with a purpose’ for people who might not otherwise have the opportunity or motivation to get involved in conservation projects and data collection.

Activity 1.4. Training workshops for MRC staff and other participants

MRC project staff were trained in Fishwatch techniques during year 1, and have carried out several training sessions with new Dive Centres during Yr 2, both independently and with the Project Leader (EW). Training sessions have been carried out at Alila Villas (now Park Hyatt Maldives) in North Huvadhu Atoll, Cocoa Island Resort (Makunufushi, South Malé Atoll),

Filitheyo Island Resort (Faafu Atoll), Shangri-La Villingili Resort (Addu Atoll). We also held a refresher course at Banyan Tree Velavaru (North Male Atoll) and the marine biologist here then went on to train the Banyan Tree marine lab staff at Angsana Velavaru (South Nilandhe Atoll).

We have simplified the training so that it can be completed in one day. The usual format for the training day is as follows:

- a) Classroom
 - Darwin Reef Fish Project: powerpoint
 - Fishwatch Maldives methodology: powerpoint
 - Discuss and explain identification sheets
 - Practice estimating fish lengths
- b) Reef session
 - Practice data collection
 - Practice estimating fish lengths
- c) Classroom
 - De-brief
 - Assess measuring accuracy
 - Enter data to spreadsheets

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

Data collection has proceeded during the year, with most Dive Centres and resorts carrying out a number of surveys each month. Completed excel files are e-mailed to the Darwin Reef Fish Project each month.

Sharkwatch has also been running throughout the year, and again data are submitted each month.

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

Fishwatch data are currently being analysed and some of the results are shown in Annex c) The report is due to be finished by late June. Each Fishwatch survey comprises a 15-minute count of all 70 target species and also the size of groupers. A total 160 surveys have been carried out at 47 sites.

Sharkwatch data for 2009-2010 have been analysed and a report produced and circulated to participants and other interested parties (Annex d). Each Sharkwatch survey consists of a 45-50 minute dive during which the number and species of shark are recorded. A total of 1661 Sharkwatch surveys at 196 sites were carried out over the first 12-month survey period from June 2009 - July 2010. The surveys provide baseline data from which it should be possible to detect future changes in the population in response to the fishing ban. Sharks were seen at 85% of sites surveyed. 44% of sites had an average of 1-2 sharks recorded per survey and the white-tip shark was the most frequently-recorded species (2247 records), accounting for 62% of all sightings.

Activity 1.8. Continued data collection & analysis

Ongoing – see above

Activity 1.9. Management of 'Sharkwatch'

Ongoing – see above

Activity 1.10. Research into spawning aggregations

Discussions with fishermen have continued and details of grouper spawning aggregation sites compiled and entered into excel. Sites have been identified in 13 atolls (Annex e). The top site was reported 17 times while others were cited fewer times and some only once. Efforts will be made in the next few months to verify these sites through further interviews with fishermen and also in-situ investigations where possible. Information on spawning aggregation location will be incorporated into the Grouper Management Plan so that measures can be taken to ensure that these aggregations are protected. However, for the time being, the locations are being kept confidential in order to avoid the possibility of stimulating additional fishing pressure on the aggregations.

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

a) Grouper and reef fish logbooks

Implementation of the trial logbooks produced in Year 1 was complicated by the drafting of more broadly-based fishery log books by the Ministry of Fisheries and Agriculture (MOFA) to meet requirements under recent EU regulations on 'Illegal, unreported and unregulated (IUU)' fishing. The main focus of these logbooks was for the tuna fisheries, but versions were also developed for grouper and reef fishing. Unfortunately the large (A3) size of the books made them very difficult to handle on the relatively small grouper and reef fishing boats (in contrast the large tuna vessels). The need to record species by weight was also impractical because of the difficulty of trying to use a balance out at sea, especially in rough conditions. As a result of these practical difficulties, there has been very little compliance by the grouper and reef fishermen.

This matter was discussed with MOFA at a meeting in early 2011 and it was agreed that the large logbooks would be withdrawn and that DRFP would go ahead with trials of the more user-friendly, A4 versions that had been developed in consultation with the fishermen (see final version in Annex f). These logbooks also better meet the data needs of the Darwin Reef Fish Project. The objective is now to trial the DRFP logbooks with grouper fishermen over the next few months in order both to collect some data and to assess how practical they are. The results will be discussed at the Grouper Management Plan Workshop scheduled for later in 2011, after which time it is anticipated that completion of logbooks will become mandatory. The workshop will provide an opportunity for necessary revisions to be made to the forms, based on feedback from fishermen and other stakeholders.

b) Aquarium fishery logbooks

The aquarium fishery logbooks have been further modified after discussions with the companies and with aquarium fishermen. The final version now on trial is in Annex g.

Activity 2.2. Train fishers in data entry

This is an on-going activity, undertaken during fishing survey trips. As explained above, there have been difficulties with the MOFA logbooks and the fishermen believe that the DRFP

logbooks will be easier to fill in. The main issue is that the fishermen do not have much time to spare during their fishing trips and don't have anyone whose allocated task is to record data (unlike on the large tuna vessels). In addition, they (and much of the boat) also tends to be wet, with few available dry spaces to fill in record sheets. Collaborative work is continuing with the fishermen to address these issues.

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

Databases are in the process of being completed, now that the format for the logbooks has been finalised.

Activity 2.4. Data collection

Logbook data collection is just about to start.

Activity 2.5. Data analysis and production of reports and recommendations

There will be a preliminary analysis for the Grouper Management Plan Workshops scheduled for September 2011.

Activity 2.6. Collection and analysis of fishery data

During discussions in the first year of the project, we recognised that it was essential to collect fishery data first-hand from the fishermen through sampling trips. This has been done in the past by MRC, with the most recent surveys conducted in 2005 and 2006. Several fishing survey trips have been carried out in yr 2, in order to collect data that will form the basis for the Grouper Management Plan scheduled for discussion at the Workshop later in 2011.

Project and other staff from MRC comprised the survey teams. The activities undertaken involved joining the fisherman on their daily fishing trips and recording the time spent on bait and grouper fishing as well as taking the length and weight of the days catch. Some days were also spent at the fish cages, carrying out length-frequency sampling of the fish as they were delivered by the fishing boats.

The following trips were carried out – for details see trip reports in Annex h.

- Vaavu Atoll 27th May to 05th June 2010
- Faafu atoll (Feeali & Bilehdhoo) Dec 15th – 24th 2010
- Faafu atoll (Feeali and Bilehdhoo) 18th - 26th February 2011
- Gaafu Dhaalu Atoll (Thinadhoo): 25th April to 5th May 2011

- N Male Atoll Bangaafaru Grouper Cage, Seapartners. Daily trips:
 - 21st Oct 2010
 - 4th Nov 2010
 - 9th Dec 2010
 - 23rd Dec 2010
 - 25th Jan 2011
 - 28th Feb 2011

- Gaagandu Holding cage, Male' atoll
 - 10th March 2011

In most cases the fishermen were willing to accept the survey team and there were no issues with regard to the collection of fishery data, especially at the fish cages. However in some instances it was not possible for the team to join the fishing vessels as planned because some of the fishermen (especially from Faafu Atoll) did not support the data collection programme and did not want the surveys to be carried out. The project team is addressing this issue and has plans for a community outreach and awareness programme which will seek to further explain the benefits of working together on fishery management. One good sign is that when project staff meet fishermen individually rather than in a group their opinion and thoughts on the management of the fishery are very much more positive.

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

We have had further discussions with purchasing departments and marine biologists/dive centre staff at a number of resorts and have further modified the resort reef fish purchasing log to make it more user-friendly. We have also added lobsters at the suggestion of project participants from the private sector who are concerned about the size of lobsters being sold to the resorts. The current data collection form and lobster ID guide is in Annex i).

Activity 2.8. Collect, enter and analyse export data

This activity has continued and summary results for 2010 have been produced for aquarium species and for groupers (Annex j).

Activity 2.9. Design identification guides to reef fish for stakeholders

Further materials have been produced to help in identification of food fish. Several visits were made to Male fish market by the project Fishery Officer in order to obtain additional photographs and these were then used in the preparation of A4 guides to reef fish and groupers. The guides are in English and Dhivehi versions and include identification notes, common name and scientific name (see Annex k). They are laminated and ring bound so ideally suited for use in the field and in wet conditions, and are currently used by project staff during fishing survey trips. They are also designed to help fishermen and resort staff check identifications before data entry into logbooks or record cards. We also produced a guide to lobsters for use by resort staff (Annex i)

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

Throughout the second year 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, build up relationships and trust 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.

Aquarium fishery stakeholders have been very cooperative and positive towards the project and have allowed us to accompany them on dives to observe collecting taking place. We have discussed all aspects of the fishery and trade and are working with the industry to produce revised quotas and other management measures.

The attitude of grouper fishermen has been more mixed, with some of the fishermen not wanting researchers from the project to join the fishing trip to sample the catch. However, they have all been open to discussions about the fishery and its management. Informal interviews were held during the fish sampling trips, and in addition, visits were made to Faafu Atoll (Sept 2nd – 6th 2010) and Baa Atoll (Oct 7th – 11th 2010) specifically for consultations about

management of the grouper fishery. During these meetings, many fishermen stated that they thought it was very important to take measures to ensure the fishery was sustainable, and came up with various suggestions about how this could be achieved, such as closed areas, minimum size restrictions and protection of spawning aggregations. Others were more wary of management either because they felt it might not be implemented properly or that the new measures might affect their income. The responses to the questionnaire used in Baa Atoll are in Annex I) and outcomes of the other discussions are in the fishing trip reports in Annex h).

All of the information gathered during the consultations will be incorporated into the draft Management Plan for discussion at the Workshop scheduled for September 2011.

Activity 2.11 Seminars / training with Maldives Customs Services

Identification guides for reef fish and grouper have been produced (see section 2.9) and these will be a useful reference for Customs. Further discussions are scheduled to take place with Customs to assess training needs.

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

Data for the Management Plans is being collected on a continual basis through the research and monitoring programmes but development of the Plans is not scheduled to begin until Yr 3. However, due to concerns about the sustainability of the grouper fishery, and at the request of the Ministry of Fisheries and Agriculture, we brought forward preparations for a Grouper Management Plan and have been concentrating our efforts on developing this plan during Yr 2. The draft will be finalised in September 2011 and discussed at a Stakeholder Workshop before being implemented.

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

The first Sharkwatch report has been distributed to all participating dive centres and is available from MRC or MCS. The first Fishwatch report will be circulated shortly (see Annex c for preliminary analysis).

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 was developed and tested in Yr 1 and has been running during Yr 2 as planned. The methodology appears to be robust and over 160 surveys have been carried out, covering 47 sites. The first analysis is just being completed and will provide a baseline assessment of abundance and distribution. Data collection and analysis will continue into Yr 3 and the results of all the surveys will be combined and used in the development of the management plan(s). At this stage we will also review the target species list and assess which ones out of the current list should be selected as long-term indicator species.

Sharkwatch has also been running throughout Yr 2, and analysis of the 2009-2010 dataset has provided the first baseline information on shark populations in the Maldives (Annex d). Continued monitoring will provide information about changes in shark populations as a result of the newly- introduced shark fishing ban.

In addition to the dedicated fish surveys, the Marine Conservation Society is also helping 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. Dr Solandt carried out Reef Check training for Bandos Resort in October 2010 so that they are now able to carry out surveys using local staff.

Our assumption that stakeholders would support the reef monitoring programme has held true, but as noted in the year 1 report we acknowledge that this may be due largely to linking with Dive Centres and Resorts that have marine biologists on their staff who are knowledgeable and interested in contributing to conservation initiatives. We believe the decision to concentrate on this sector initially was the most productive way of getting good data sets early on. The only slight difficulty is that the marine biology staff tend to rotate quite quickly (nearly all are expatriates because of a lack of locally-trained marine biologists), but generally, on-going environmental programmes such as Fishwatch are continued.

In order to bring in more participants we have put together a subset of distinct indicator species which fit on a single sheet (Fishwatch 2 Annex b) and are offering this as an alternative. We have learnt through discussions with other resorts that the Dive Centre staff generally will not have the capacity to take on much in the way of additional tasks, but that it might be possible to do a simplified version.

Another aspect of the reef fish monitoring programme is to collect information about the location of grouper spawning aggregations. We have obtained information directly from fishermen (Annex e) and are currently developing a very simple questionnaire for Dive Centres with the aim of cross-checking and adding to the list.

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 has taken longer than anticipated to finalise due to the trialling of more general reef fishing log books by the Ministry of Fisheries and Agriculture (MOFA). These have now been withdrawn by MOFA because of the difficulty of using them in the field and because they did not include sufficient details for monitoring and management purposes. The other difficulty is that until it becomes mandatory to fill in catch logbooks, some of the fishermen are reluctant to use them. However, others have indicated that they are willing to work with us and so progress is gradually being made.

In the meantime, data on catch and effort has been successfully collected through fishing survey trips and by carrying out surveys at fish cages. These surveys are providing good length-frequency data and the information has been supplemented by semi-structured interviews with fishermen who have willingly provided information on average catch size and perceived changes in the fishery.

Monitoring of trade in aquarium fish and grouper has continued throughout the year through analysis of the pro-forma export forms completed by the exporting companies and submitted to Customs. This is currently quite a time-consuming process for project staff and we are considering ways in which it could be streamlined in the future.

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

All of the activities undertaken so far will feed into the Management Plan(s). Three separate plans will be produced: grouper fishery, reef fishery and aquarium fishery. Preparation of the plans is dependent on data from the monitoring schemes and was scheduled to begin in Year 3. However, due to concerns about the sustainability of the grouper fishery, we have been working on a management plan for this fishery in the current year. Much of the fishery data and

other information needed to develop the plan has been collected during yr 2 and the draft Management Plan will be completed by September 2011 and presented at a stakeholder workshop.

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

The first analysis of Fishwatch data is virtually complete and the report will be distributed by early July 2011. The first Sharkwatch report has already been completed and circulated.

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 |
| 4D | N ^o of training weeks | 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 | | | 37 |
| 6B | Number of training weeks to be provided | 18 x 3d = 11wks | 19 x 1d = 5wks | | | 16 |
| 7 | Number of training materials produced for use by host country | 2 Powerpoint presentations; CD of survey protocols | 0 | | | 2 |
| 8 | Number of weeks spent by UK project staff on project work in the host country | 8 | 6 | | | 14 |
| 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 | | | 0 |
| 10 | Number of individual field guides/manuals to be produced to assist work related to species identification, classification and | Reef fish ID poster (A1) Illustrated field survey record sheets (x 4) | Illustrated field guides (laminated A4 sheets) for ID of groupers & other reef fish. | | | 4 |

| | | | | | | |
|-----|--|---|---|--|--|--------|
| | recording | incorporating 70 spp) | Illustrated field survey record sheets (x 2 incorporating c 50 spp) | | | |
| 11A | Number of papers to be published in peer reviewed journals | 0 | 0 | | | 0 |
| 11B | Number of papers to be submitted to peer reviewed journals | 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 | | | 4 |
| 14A | Conferences/seminars/ workshops organised to present/disseminate findings | 0 | 0 | | | 0 |
| 14B | N ^o of conferences/ seminars/ workshops attended at which findings from Darwin project work presented/ disseminated. | 2 | 1 | | | 3 |
| 15A | Number of national press releases in host country(ies) | 0 | 0 | | | 0 |
| 15C | Number of national press releases in UK | 0 | 0 | | | 0 |
| 17A | Number of dissemination networks established | 0 | 1 | | | 1 |
| 20 | Estimated value of physical assets | £1,350 (computer + dive slates) | 0 | | | £1,350 |
| 23 | Value of resources raised from other sources: Support in kind from volunteers & private sector MRC time & overheads | | | | | 34,000 |

- 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 £ 0 |
|---------------------------------------|---|----------------------------|--|-------------|
| Information leaflet* | Darwin Reef Fish Project | MCS/MRC | | 0 |
| Information leaflet* | Fishwatch Maldives | MCS/MRC | | 0 |
| Field identification sheets for fish | Fishwatch Maldives fish survey sheets | MCS/MRC | | 0 |
| Survey protocols* | Fishwatch Maldives: information for participants. | MCS/MRC | | 0 |
| Poster * | Reef fish | MRC | | 0 |
| Powerpoint presentations | Fishwatch Maldives Darwin Reef Fish Project | MCS/MRC | | 0 |
| Report* | Sharkwatch | MRC | | 0 |

* Digital copies provided. Hard copies available on request

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. Data entry has gone smoothly and the first analyses have been completed on schedule.

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

One of our targets for year 2 was for the daily fishing logbooks to be operational and bringing in data. Further modifications were made to the logbooks following discussions with fishermen but, as explained previously, introduction of the log books has been delayed (see p.5). This is being addressed, and in the meantime, information on catch and effort has been recorded through fishing surveys.

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

We have concentrated our effort on the grouper fishery for this year because development of a grouper management plan has been designated as a priority by the Ministry of Fisheries and Agriculture (MOFA). Good progress has been made on this element of the work programme. MOFA has requested that this plan is completed as soon as possible and will be responsible for its implementation. Successful implementation depends to some extent on enforcement and we have been discussing this aspect with a number of agencies responsible for law enforcement at sea. The plan is also much more likely to succeed if the fishermen accept the need for management and agree with the proposed measures. We have already had many discussions with the fishermen and these will be continued at the Workshop in September 2011. The project is also taking steps to enhance awareness of the benefits of a managed and sustainable fishery amongst all key fishery stakeholders

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 set at a sustainable level. We are satisfied that the first steps have been taken to reach this goal. It is unlikely that we will be able to measure change / success until the end of the project. It will only be when the management plan has been devised and implemented and the monitoring programmes have been running for a few years that the impact of the project on biodiversity and resource use will be measurable.

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 the project goals are achieved. As in Year 1, one of the main lessons learnt is the need to engage fully with the different stakeholders – particularly the fishermen, who may be resistant to change or management initiatives. We have found that, individually, many of the fishermen are receptive and support management measures, but are worried about loss of income and

suspicious of new initiatives because of management failures in the past. We believe it is extremely important to continue to build up strong relationships with fishery stakeholders and will be working on an awareness programme to ensure there is full understanding of the benefits of management.

We are fortunate to have the support of dive centres and marine labs for the underwater survey work and need to ensure that we fit with their capacity to give time to contribute to the monitoring programme. For this reason we have developed some even easier record sheets featuring key indicator species.

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).

6. Other comments on progress not covered elsewhere

No additional comments.

7. Sustainability

We have maintained relationships with stakeholders and interested parties established during Year 1, and made new links with additional agencies, Dive Centres and resorts. These collaborations are seen as vital to the long-term success and sustainability of the project.

Our target for the end of the 4-year project is to have new and practical systems in place for monitoring, evaluating and managing use of reef fish in the Maldives. These will continue to be carried forward by MRC, which has a statutory responsibility to carry out marine resource surveys and collect fishery data. We cannot guarantee that Management Plans will be implemented, but the Ministry of Fisheries and Agriculture are concerned about grouper stocks and are looking to the Management Plan produced by the project for solutions. If the plan can be shown to be workable and acceptable for all stakeholders then the outlook for successful implementation is good. We plan a similar approach for the reef and aquarium fisheries.

8. Dissemination

Fishwatch and Sharkwatch data have been analysed and disseminated to participants and other interested parties, and we are just completing an e-newsletter that will be circulated more widely, especially within the Maldives. We have been disseminating information to fishermen throughout the year through face-to-face meetings and distribution of the grouper information leaflets. This awareness activity will be expanded in the run-up to the Grouper Management Plan Workshop scheduled for September 2011, and will include articles in the local press. A news item about the project was published in the MCS magazine '*Marine Conservation*' in spring 2011.

Project Expenditure

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

| Item | Budget | Expenditure | Variance |
|---|--------|-------------|----------|
| Rent, rates, heating, overheads etc | | | |
| Office costs (postage, telephone, stationery) | | | |
| Travel and subsistence | | | |
| Operating costs (insurance and medical cover, field allowances; equipment maintenance, miscellaneous survey items) | | | |
| Printing | | | |
| Conferences, seminars, island office meetings, fishermen meetings etc | | | |
| Capital items/equipment | | | |
| Others Design of additional survey sheets, recording boards & fittings, laminating, underwater camera maintenance; misc items for field work | | | |
| Salaries E Wood 7,500 J. Miller 1,650 Clare Perez 500 S Sattar 1,000 M Ushan 8500 A Najeeb 8500 | | | |
| TOTAL | | | |

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: 2010-2011

| Project summary | Measurable Indicators | Progress and Achievements April 2010- March 2011 | 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>The different elements of the monitoring programmes that were developed in the first year have been put into practice, and data collection has been going well. A few of the recording systems have been slightly modified in order to ensure that data collection is as straightforward as possible for participants and provides all the relevant information that will be needed for the development of management plans. Work has begun on a Grouper Fishery Management Plan.</p> | <p>The monitoring schemes will be continued and expanded where possible, with adjustments being made to the monitoring programmes if it appears that additional information is needed for the management plans. A draft Management Plan for the grouper fishery is currently being prepared and will be presented at a Workshop for stakeholders in Sept 2011. Management plans for the other fisheries will be developed later in the project.</p> |

| | | |
|---|--|---|
| <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>Progress towards this output is on target, with surveys and monitoring underway and data analysis on the first year's output from Fishwatch and Sharkwatch completed. Data on grouper spawning aggregations has been obtained through interviews with fishermen.</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.</p> | |
| <p>Activity 1.2.</p> <p>Establish network of survey teams</p> | <p>Further progress has been made 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 are in use and new recording sheets using the same methodology have been developed for key indicator species.</p> | |
| <p>Activity 1.4.</p> <p>Training workshops for MRC staff and other participants</p> | <p>MRC and MCS have carried out additional training sessions for new participants.</p> | |
| <p>Activity 1.5.</p> <p>Design databases and train MRC staff & other stakeholders</p> | <p>The excel spreadsheets developed in year 1 have been used successfully throughout the year.</p> | |
| <p>Activity 1.6.</p> <p>Data collection / field surveys / data entry</p> | <p>Data collection and entry has been on-going throughout Yr 2</p> | |

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| Activity 1.7. Analysis of data and production of report(s) | | Analysis of the first year of data from Fishwatch and Sharkwatch has been completed. |
| 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 2 |
| Activity 1.10 Research into spawning aggregations | | Further information has been obtained during interviews with grouper fishermen throughout Yr 2. |
| Output 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>Introduction of logbooks has gone more slowly than anticipated, as explained elsewhere in this report.</p> <p>Data collection from fish cages and fishing trips has proceeded well and has provided grouper length-frequency data which will be used during development of the 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 following consultations with fishermen. |
| Activity 2.2. Train fishers in data entry. | | Procedures for filling in the logbooks have been explained and discussed with fishermen, leading to slight modifications to make them as user-friendly as possible. |
| Activity 2.3. Establish databases and train MRC staff in data entry and analysis | | Databases linked to each of the updated logbooks have been prepared. |

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| Activity 2.4. Data collection | This activity is just beginning. |
| Activity 2.5. Data analysis and production of reports and recommendations | A preliminary analysis of grouper log book data is planned for later this year. |
| Activity 2.6. Collection and analysis of fishery data | Survey trips have been conducted at grouper fish cages and on fishing vessels to collect weight/length data by species. |
| Activity 2.7 Design and introduce logbooks for 'end users' | These logbooks were developed in order to investigate the value and market for reef fish and are being introduced 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 2 by the two Darwin project officers. |
| Activity 2.9. Develop identification guides to reef fish for stakeholders | Illustrated, laminated ID guides to groupers and reef fish have been developed for use in the field to help ensure accuracy when filling in the fishery logs. |
| Activity 2.10. Consultations and fact-finding meetings with fishery stakeholders | Further meetings have been held during Yr 2 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. |
| Activity 2.11. Seminars with Maldives Customs Services | Further seminar will be carried out once needs have been assessed. |

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| <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 on the Management Plans was not scheduled to begin until Yr 3. However, due to concerns about the sustainability of the grouper fishery, we brought this forward to Yr 2. The Draft Grouper Management Plan will be completed in time for a workshop in September 2011.</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>This activity is scheduled for Year 3/4</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 3/4</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. Material is being gathered for articles and scientific papers but further analysis is required before these can be completed.</p> |
| <p>Activity 4.1.</p> <p>Website established</p> | | <p>Project information is at http://www.mcsuk.org/conservation_in_action/Coral+reefs/Maldives/Maldives</p> |
| <p>Activity 4.2.</p> <p>Workshops with stakeholders</p> | | <p>Small focus group meetings have taken place throughout the year – a Grouper Management Plan workshop is scheduled for yr 3.</p> |

| | |
|---|---|
| Activity 4.2. Articles and scientific papers prepared | Work on this has begun but more data are required before completion of drafts |
| Activity 4.3. Data shared with global databases | This activity is re-scheduled for Year 3 |

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: 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 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 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 | |

| | | | |
|---|--|---|--|
| <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> |
|---|--|---|--|

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|--|---|--|--|
| <p>2. System for long-term monitoring of catch, effort and value of reef fisheries established.</p> | <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> |
| <p>3. 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>3.3. 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> |
| <p>4. 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>1. Website</p> <p>2. Electronic and hard copies of articles & reports</p> | |

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 | | | | | | |
| 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 | | | | | | | | | | | |
| 2.4 | Data collection in operation by Yr 2. | | | | | | 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 |
| 2.7. | Develop & implement logbooks for 'end users' ; analyse data | | | | | 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 |
| 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 | | | |
| 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 | | |
| 3.2 | Produce revised management plans by end of Yr 4 | | | | | | | | | | | | | | | x | x |
| 3.3 | Management measures introduced on the ground by end Yr 4 | | | | | | | | | | | | | | | 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)

- a) Fishwatch information for participants (ppts and manual)
- b) Fishwatch snorkeller and Fishwatch 2 survey sheets
- c) Fishwatch data –preliminary analysis
- d) Sharkwatch Report for 2009-2010
- e) Location of grouper spawning aggregation sites (confidential: not for circulation)
- f) Grouper fishery daily logbook
- g) Aquarium fishery daily logbook
- h) Fishing survey trip reports
- i) Resort purchasing logbook and lobster ID guide
- j) Export data: aquarium species & groupers
- k) Field ID guides for grouper and reef fish
- l) Baa atoll grouper fishermen consultation responses
- m) Fishwatch 2 survey sheets