
Developing Marine Reserves for Biodiversity Conservation and Sustainable Fisheries in Rodrigues

Development of a strategy for marine reserve management in Rodrigues using community consultation and stakeholder participation

Report on second visit to Rodrigues, 27 March to 16 April 2006

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Summary and recommendations

Progress continues to be made towards the implementation of the marine reserves in the northern lagoon of Rodrigues. A number of key issues have emerged from work over the past year:

1. Awareness raising: While the legal implementation of the marine reserves is under way, there are still many people in the communities that will be affected who do not know about the marine reserves. Wider awareness raising of the designation process and its implications is urgently needed to ensure that local communities understand and support the designation. Shoals Rodrigues could suggest and support the formation of marine reserve sub-committees made up of stakeholders from each marine reserve site who can be well-informed about designation and can pass on concerns to the Co-ordinating Committee for Fisheries and Marine Resources.

2. Addressing the concerns of stakeholders: The main concerns of those stakeholders who do know about the designation are:

1. How the marine reserves will be enforced and who by
2. How displaced fishers will be helped – through compensation, training or alternative income schemes

Without planning for alternative or additional incomes for fishers and possible compensation for those most seriously affected, the marine reserves will not work because people will be forced to fish illegally to make a living.

3. Clarification of roles in the implementation and management of the marine reserves: there seems to be a need for clarification of the roles of those organisations involved as there is currently confusion amongst stakeholders and other parties about who is responsible for implementation of the legislation.

4. The role of Shoals Rodrigues. Shoals Rodrigues need to keep their active role in the designation process and in the development of management plans. They should also keep passing on the valuable information they are collecting on biological and social aspects of the marine reserves, for example the full transcripts of the stakeholder meetings, summaries of relevant MSc projects carried out in collaboration with Shoals Rodrigues, etc.

5. Site profiles. The detailed MSc study of the Anse aux Anglais site was a very effective way to rapidly assemble a large amount of relevant data and fill information gaps. This approach should be continued for the three remaining marine reserve sites (Grand Bassin and Passe Demie may warrant two MSc studies per site)

6. Alternative livelihoods. A dedicated investigation into alternative livelihoods is needed on a site by site basis, ideally starting with Rivière Banane, the first marine reserve to be implemented. The Cordio Soc Mon information will provide a good basis for this and further collaboration with Cordio, and use of the lessons learnt from their alternative incomes work will be valuable. Ideally this will be organised and funded by the RRA in collaboration with Shoals Rodrigues.

7. Rivière Banane Pilot Project. If the Rivière Banane pilot project can be effectively implemented this could promote the success of the other reserves. A 2006 MSc project on the biological and social characteristics of this site would be a very valuable contribution at this stage.

The status of the Rodrigues northern lagoon marine reserves project

Brief overview of progress since last visit

The Rodrigues Regional Assembly (RRA) is currently in the process of finalising the legal status of the 4 marine reserves in the northern lagoon (Passe Demie, Grande Bassin, Anse aux Anglais and Rivière Banane). The draft regulations were recently sent to Mauritius for approval and ratification. Shoals Rodrigues continue their regular fisher training programmes, stakeholder meetings, and wider work of raising awareness of marine conservation and sustainable marine resource use. The RRA have not yet carried out any data collection of their own in the communities that will be affected by the marine protected areas or any other awareness raising. Communication with communities on the development of the marine reserves has so far mainly been by Shoals Rodrigues.

In March 2006 Shoals Rodrigues completed a new round of stakeholder meetings with each of the communities that will be most affected by the northern marine reserves. Full notes were taken on what stakeholders said at these meetings and these notes can be seen in Appendix 1. These stakeholder meetings and the more detailed work completed with the community who use the Anse aux Anglais marine reserve area by MSc student Lucy Jacob indicate that a significant proportion of resource users were not aware of the designation.

Concerns have been raised by people in the communities who will be most affected by the marine reserves that they haven't heard anything directly from the government about the development of the marine reserves. There are also concerns about the implications of designation and how highly protected the areas will be. For example there is uncertainty and concern about access to the marine reserves and whether vessels will be permitted to sail through them.

Concern was also expressed about the reduced fishing opportunities that will be available in the designated areas and fishers are seeking assurance that provision will be made for them in the form of compensation, re-training or other support for additional or alternative sources of employment.

Update on the recommendations for the next stage in the development of the marine reserves from 2005

In this section I refer back to the recommendations made in my 2005 report and how work has progressed in these areas between April 2005 and April 2006. Shoals Rodrigues have responded very well to these recommendations and much has been achieved. Most of these recommendations are on-going.

Recommendation 1: Biological information on sites.

This has been successfully completed for Anse aux Anglais by a Bangor University MSc student, Lucy Jacob, during July and August 2005. This approach to gathering detailed information appears to have worked well and should ideally be completed for all 4 sites (as is planned by Shoals Rodrigues). From the biological point of view the most valuable contribution of Ms Jacob's thesis is the detailed information it provided on the current state of habitat within and adjacent to the marine reserve. Whilst a large proportion of the designated area is badly impacted and of poor quality, the area also included some good quality habitat with good coral cover and diverse fish populations.

Important points to bear in mind for future detailed studies are:

- (a) The importance of clear methods to enable the studies to be replicated in the future.
- (b) Ensuring that any raw data that may be necessary for future comparisons is stored by Shoals Rodrigues staff in an easily understandable format.
- (c) Mapping the habitat information for marine reserves and adjacent sites might be a valuable tool in developing management plans and liaising with stakeholders.

A similar MSc project by a Bangor University student for is planned for another marine reserve site this summer, which will be a great contribution to the process.

Recommendation 2. Socio-economic data collection on the sites.

Some social information was collected as part of Lucy Jacob's thesis, particularly on the stakeholders' perceptions of impacts, their expectations of the marine reserve and other qualitative information. Again, if similar surveys can be incorporated into MSc projects assessing the other three sites this would be really valuable.

The Cordio SocMon work planned for Rivière Banane will be an invaluable pilot study. If this is then rolled out to the other marine reserves sites, this would be a really useful baseline for local and regional use.

Recommendation 3. Community awareness raising.

Shoals Rodrigues continue their regular awareness raising with fisher training, schools visits and Club Mer, all of which are contributing to community knowledge of marine reserves, the need for sustainable marine resource use, and the value of marine conservation.

The latest round of stakeholder meetings held by Shoals Rodrigues have played an important role in raising awareness of communities about the development of the reserves in the north of the lagoon as few fishers were aware of how the reserves were progressing through government.

Lucy Jacob's MSc thesis work obviously played a role in community education as many of the stakeholder she spoke to were not aware of the designation of the Anse aux Anglais marine reserve. Hopefully awareness of the designation of the 4 reserves is increasing all the time but future MSc projects may play an important role in introducing stakeholders in other communities to the designations. It is therefore important that MSc students undertaking this work have been thoroughly briefed on what is happening and also on more general marine reserve theories and recent science so they can answer questions and play a useful role in raising awareness on a one-to-one basis.

If Shoals Rodrigues have the opportunity to do more sensitization work it seems key that the widest range of stakeholders should be included in the meetings. If possible, local marine reserves committees representing all the key stakeholder groups: all the main fishing types, hotels, divers, tourist operators, etc could be formed (with the agreement and support of the Co-ordinating Committee on Fisheries and Marine Resources). These committees could communicate the concerns of the community to the RRA and to Shoals Rodrigues. The latter could in turn ensure that each of the stakeholder communities represented were kept fully up to date with marine reserve developments.

There are concerns that there has been no formal awareness raising on the development of the marine reserves by the Rodrigues Regional Assembly. A number of questions that have come up repeatedly at the stakeholder meetings are related to what the government is planning. At a number of stakeholder meetings, stakeholders suggested that next time there was a meeting about marine reserves it would be helpful if there was someone there representing the Rodrigues Regional Assembly to answer questions.

Recommendation 4. Institutional awareness raising

Shoals Rodrigues are continuing this work through the production of posters, newspaper articles and other awareness-raising activities. Awareness raising is a continuous process so every opportunity to raise awareness should be taken. Shoals Rodrigues staff should continue to alert their colleagues on the Co-ordinating Committee for Fisheries and Marine Resources to new information on marine reserves, conferences or training they have been on and so on.

If time permits, public presentations on marine reserves would contribute to the wider understanding of their purpose. If there are opportunities for radio and television interviews this was agreed by Shoals staff to be the best way of reaching the widest audience.

Recommendation 5. Community and institutional identification of aims and expectations

As government involvement develops, the points made about this in my first report will still be relevant and could contribute to discussions of how to take community involvement forward at the Co-ordinating Committee for Fisheries and Marine Resources meetings.

Identification of community and institutional aims and expectations was covered well for the Anse aux Anglais community in Jacob (2005).

Recommendation 6. Documenting consultation meetings and all other activities relating towards decision-making about the marine reserves

Detailed minutes have been taken of the stakeholder meetings and a book is now being kept by Shoals Rodrigues to record all meetings and other developments associated with the marine reserves. This will be really useful. Any informal discussions, media articles or other records that give an insight into how the marine reserves are developing can also be kept.

Recommendation 7. Lagoon use mapping

This is proving difficult to incorporate into the hectic everyday activities of Shoals Rodrigues. Whilst every effort should be made to begin to make this part of the daily routine, it may be more realistic to collect snap-shot data as part of detailed site studies undertaken for each marine reserve site. Lucy Jacob's month long monitoring of octopus fishers from a fixed observation point is a good example of the kind of snap-shot data that can be collected.

Excellent data is collected on fishing sites for the seine net fishery, so if data collection on all other fishing methods develops this year (as part of the fish landing site monitoring developing in collaboration with FRTU), good spatial data collection should be possible for other fishing methods too. Information on spatial use by other resource users, for example tourism and recreational users, is also important. For example, is it possible to collate dive and snorkel site information and recreational angling information from tourist operators? If they keep good records and are happy to share the data this could be mapped to give a useful insight into current uses of the designated sites. A useful project (e.g. for an MSc student) might be mapping and quantifying recreational uses of the lagoon.

Recommendation 8. Produce a map of local fishing site names

Sylvio Perrine and the Fisheries Research and Training Unit (FRTU) fisheries enumerators are keen to collaborate with Shoals Rodrigues on the production of a map of fishing site

names. They have a good knowledge of where people are fishing throughout the lagoon so this should provide a really good basis for a full map of local names.

When Shoals Rodrigues staff are working with FRTU enumerators and recording sites fished by fishers at landing sites, local names will be recorded and as each new name comes up, it can be marked on maps of the lagoon.

The locations could then be verified when convenient when Shoals staff are out with the seine net fishers and by visiting other parts of the lagoon with fishers, and/or FRTU enumerators. Eventually, a GIS version of the local names information could be created and made available to Shoals, FRTU and FPS staff, and to Co-ordinating Committee for Fisheries and Marine Resources to assist in future work with stakeholders.

Recommendation 9: Developing appropriate monitoring.

The large seine-net fishery monitoring is now well-developed with a fifth year of detailed data being collected. The main monitoring that still needs developing is that of the other fisheries. Landing site monitoring with FRTU should give the opportunity to compile detailed profiles of catch and catch per unit effort information from the trap, line and octopus fisheries. It will also contribute to mapping of uses of the designated areas. This could also be a useful opportunity to build up landing site profiles, including information on how fishing activities vary with seasons, tides, weather and so on. This information will complement detailed studies completed by MSc students and the broader fisheries information collected year-round by FRTU staff.

Recommendation 10: Develop trap and line fishing monitoring

Slow progress has been made in establishing protocols for line, basket trap and octopus fisheries sampling at the fish landing sites in collaboration with FRTU because it has taken some time to set up the collaborative project.

Agreement has now been reached between FRTU and Shoals that will allow Shoals staff to join FRTU enumerators at landing sites. FRTU will record all the information they normally record and FRTU and Shoals staff will work together to collect additional information, including more detailed information on catch composition, including fish lengths.

Some initial difficulties were encountered with co-ordinating site visits to correspond with the times that the enumerators are at the landing sites. The enumerators explained that this was because there are some sites to which very few fishers actually bring their catches back, so information is gathered from these fishers by interview rather than direct catch assessment. The enumerators identified sites where fishers always bring their full catch back to the landing site as follows:

- Baie aux Huîtres
- Anse Goeland
- Baie Mallagache
- Baie du Nord
- Point l'Aigle
- Tamarin
- Dans Coco
- Port Sud Est
- Mourouk
- Gravier

They felt that these sites would be the most suitable for Shoals staff to join them to carry out more detailed catch assessments.

Initially, it would be useful to focus on visiting these sites with the enumerators but other sites probably need to be assessed too. Whilst the sites above cover a good portion of the south and west coast landing sites, they don't include any landing sites on the north-east coast. Developing protocols to get detailed fisheries data from landing sites on that coast is important because of the location of two of the marine reserves off the north-east coast and the fact that Rivière Banane is intended as the first marine reserve to be implemented.

Regular fisheries data from Anse aux Anglais, Grand Baie and Rivière Banane would be valuable and if a suitable method of obtaining these data in collaboration with FRTU can be devised then every effort should be made to collect these data.

Recommendation 11. Fish gonad development work

During my visit a number of siganid, scarid and gerreid fish were dissected and their gonads photographed and weighed.

Because of limited resources for buying fish and limited time for dissection on return from long days of seine-net fishing, it is recommended that one species is studied each year. For example, *Siganus sutor* would be a suitable species to concentrate on for this year.

The current methodology of measuring and weighing the fish chosen, dissecting out gonads and weighing them can be developed to include:

1. Photographing gonads neatly dissected out of the fish (this was tested on two occasions during my visit).
2. Attempting to identify the sex and maturity stage of the gonads (see Table 3 in Kulmiye et al 2002 for a good example of stages to look for in *Lethrinus harak*, adapted from a table for *Siganus sutor* in Ntiba & Jaccarini 1990)
3. Possibly preserving samples of gonads for future histological examination.

A detailed study of maturation and fecundity of one species could be done as a research project for Shoals staff or as an MSc project.

Recommendation 12: Recommendations for additional projects/funding applications

Because all Shoals Rodrigues staff are already so busy in their specialist areas, it would still be useful (in an ideal world!) to have a member of Shoals Rodrigues staff devoted full time to marine reserves work. They would then be able to devote more time to liaising with RRA representatives and stakeholders, and keeping up to date on marine reserves science and management.

A new recommendation would be for a project to investigate and implement alternative incomes for displaced fishers at Rivière Banane and possibly Anse aux Anglais too. This would be really useful to support the progress of the marine reserves, but issues regarding who is responsible for issues such as compensation and alternative income creation need to be resolved with the RRA first.

Recommendation 13. Marine protected areas references

A CD of marine protected area references, particularly focusing on case studies and other publications on alternative incomes, compensation and on the enforcement of marine reserves was prepared for Shoals Rodrigues and hard copies of other papers were left.

Recommendation 14. Developing links with the UNDP Marine Park Project

The UNDP project was awaiting a new Technical Advisor during my visit. However, Mr Genave of the Co-ordinating Committee for Fisheries and Marine Resources and Mr Pierre Louis, Administrative Assistant on the UNDP Marine Protected Area project indicated that there could be opportunities to link the projects, for example through joint training opportunities.

As the northern marine reserves will be implemented before the southern marine protected area, the success of the northern reserves could influence the development of the southern MPA. If the northern reserves are a success, support for the southern MPA is likely to be high and vice versa.

Ongoing work

Developing landing site monitoring with FRTU

Currently, there is very good information available on the seine net fishery from Shoals Rodrigues seine net fisheries monitoring work. These data will provide a baseline with which to compare fisheries catch, effort and catch per unit effort once the reserves are implemented. However, it is important to have a similar level of data for other fisheries in the affected areas – mainly trap, line and octopus fishing.

It is really important to have good baseline data on:

1. Fishing activities in and around the marine reserves before enforcement begins.
2. Fishing effort and catch per unit effort in and adjacent to the marine reserves.
3. Catch composition in terms of species and size of individuals in and adjacent to the marine reserves.
4. Fishers' perceptions of the current state of the fishery and views on the marine reserves and other fisheries management in place.
5. Good information on spatial location of fishing activities.

This information will:

1. Support decision-making on compensation of fishers and provision of other support such as retraining for alternative livelihoods.
2. Allow the effects of the marine reserves on fisheries to be monitored.
3. Allow changes in fishing effort, patterns and to some extent fisher behaviour to be quantified.
4. These monitoring results can be made available to managers and fishers to help maintain support for the marine reserves and to advise adaptive management where appropriate.

The current FRTU monitoring will provide some information on the first and second point above, but the developing collaboration with Shoals Rodrigues will help in the collection of the catch composition and fish length data. More detailed information on effort and catch per unit effort and more detailed identification of sites fished would be useful in addition to the information already collected by FRTU. It is important that whilst the FRTU collaboration should result in additional data collection in the areas identified above, it shouldn't affect the regular data collection of FRTU. These long term data sets on landings will be very useful for looking at the changes to the fishery in response to management over longer time frames.

The plan is for Shoals Rodrigues to join FRTU staff two days a week. The three FRTU enumerators work on a rota which is planned for the month so it is possible to plan which landing sites to visit at the beginning of each week. The enumerators also suggested calling them the evening before to check times to meet and other details.

Inevitably, monitoring fish landing sites will involve a lot of waiting around. This time can be put to good use, using it to work with enumerators on maps of the fishing site names, building up a profile of activities at each landing site through conversations with the enumerators, fishers and others who know the sites well. Laminated maps of the lagoon have been prepared to take to landing sites for this purpose. Time spent waiting for fishers to return can also be used for informal training, for example revising fish identification together with the enumerators.

Selecting appropriate landing sites to survey

To get enough data from each site for it to be useful for long term monitoring it makes sense to monitor a selection of the 23 landing sites. In my last report I suggested 12 sites that gave good geographical coverage of the coast.

Jovani Raffin and I met with Gaspard (one of the FRTU enumerators) on Thursday 13 April at Anse aux Anglais fish landing site. It was not possible to sample any catches with him as he had to leave for a meeting and said there wouldn't be any fishermen returning to the fish landing site with fish anyway. He said that a problem at many sites was that fishers had sold their fish before they reached the main fish landing site where the enumerators are posted. We explained that we wanted to be able to measure fish at the sites together with the enumerators and asked him if there were any particular sites where this would be possible.

For the northern sites (his allocated sites) Gaspard suggested:

1. Baie aux Huîtres

He said that about 20 basket trap fishers fish from this site and they land their catch where the enumerator waits, so Shoals staff could measure their fish with the enumerator. At this site the basket fishers tend to land their catches on Monday, Wednesday and Friday. They fish in the Grand Bassin area, so this would be a good site for baseline and monitoring data relevant to the marine reserve.

2. Anse Goeland

Again Gaspard suggested this as a good site for monitoring catches with the enumerators as fishermen land their catch at the actual landing site. Around 15-20 basket fishers and line fishers use this site and land their catch every day. They fish between Grand Bassin and Île aux Coco. This would be another good site for monitoring regarding the marine reserves.

3. Baie Malagache

Gaspard suggested this as another good site for monitoring. There are 14 fishers in total, 6 trap fishers and the rest octopus and line fishers.

4. Baie du Nord.

There are 189 fishers in total at this site, mainly seine fishers. He said that there are about 30 basket trap fishers. At this site basket trap fishers tend to land their catches on Monday, Wednesday and Friday.

5. Point l'Aigle

Gaspard identified this as another good site for monitoring with 16 fishers in total, including three basket trap fishers.

Sitting down with the enumerators to identify the sites suitable for the kind of data collection intended seemed to be an effective way forward so Jovani then spoke to another enumerator, Milazar. The sites he recommended in the west were:

1. Tamarin, where there are 5 basket trap fishers
2. Dans Coco, where there are around 20 trap fishers
3. Bengelique, where there are around 5 basket trap fishers.

At these sites the fishers fish every day and bring the fish to the proper landing site where the enumerator waits.

The following day Jovani spoke to the third enumerator, Tolbiz, and the sites he suggested as suitable for fisheries monitoring where:

1. Port Sud Est
2. Mourouk
3. Gravier

This means that monitoring of 11 out of the total of 22 fish landing sites should be possible in close collaboration with FRTU. These sites differ from the 12 suggested in my 2005 report, and the main concern is the big gap in sampling sites from Port Mathurin to St Francois. A plan to either work with individual fishers or get permission from Sylvio Perrine to sample catches at the actual landings sites even if the enumerator isn't there will be necessary. How monitoring at these more difficult sites develops will depend on how the routine monitoring at the other sites goes and what can be agreed with FRTU staff.

Protocol for fisheries monitoring

A suggested catch data sheet was produced as a reminder of key details it would be good to get from fishermen in addition to the information they give to the FRTU enumerator. In collaboration with the enumerator, Shoals staff should try and get as much of this information as is practical. If fishers are in a rush the main extra information to get is:

1. *For basket trap fishers:* record the time they left and the time they returned and if possible the time spent fishing (separating that from time spent travelling to fishing sites). Also ask them the number of traps and how many days they have been set for. The trap type would also be useful.

Identify all fish and measure total length. Weigh total catch if possible, otherwise this can be calculated from length-weight relationships already established.

2. *For line fishers:* record the time left and time returned and time spent fishing, how many lines, how many hooks and bait used.

Identify all fish and measure their total lengths. Weigh total catch if possible.

3. *For octopus:* record the time left and time returned and if possible time spent reaching fishing site (this may not be possible), weight and sex of octopus. Identify, measure and record any other catch.

4. *Other types of fishing*: if there are any other types of catches record this information too.

Key issues of concern to stakeholders

Loss of fishing opportunities – provision for compensation and alternative livelihoods

Compensation

Compensation has been used in some circumstances to help fishers deal with the loss of part of or all of their fishing grounds when marine reserves have been established. Compensation can play an important role in the success of marine protected areas, especially if it is made available to some of the most vulnerable groups who are least likely to be able to take advantage of alternative incomes.

To pay compensation in a fair manner, a reasonable idea is needed about who used the designated area before it became a reserve and how much of their income was derived from that area. Good data collection on socio-economics of the communities involved is therefore vital to the success of any compensation scheme.

Alternative livelihoods

The provision of alternative livelihoods for fishers partly or completely displaced by marine protected areas has been identified as an important factor in the success of marine protected areas around the world. There are four main approaches (often used in combination):

1. Provide employment for displaced fishers in the management of the marine reserve: as community rangers, community educators, assisting in monitoring, etc.
2. Assisting fishers displaced by a marine reserve to start another type of fishing – this often means encouraging fishers offshore – this is already happening in Rodrigues with the provision of offshore Fish Aggregation Devices (FADs) and a new scheme to encourage community owned offshore fishing operations (S. Perrine, pers. comm.).
3. Assisting fishers to retrain in a new trade.
4. Assisting fishers to work in the tourist sector which often develops alongside a protected area.

Giving fishers the opportunity to diversify their income sources has often been found to work best. Providing opportunities for employment in the marine protected area (and particularly encouraging local fishers to take these jobs), providing training opportunities in a wide range of fisheries, agriculture, tourism and other sectors give the fishers the best chance to ensure a regular income that is not going to depend on a single sector. Tourism can be a lucrative source of income for fishers but it may not be a dependable source in the long term because the tourist market is unpredictable.

In Rodrigues, the community fishing vessel project to provide resources to co-operatives to start off-lagoon fishing is currently underway and is scheduled to be completed by June. It is not particularly targeted at fishers who will be displaced by marine reserves. Off-lagoon fishing is obviously specialised and the new fishers will require training and support. It is also a potentially expensive fishery with initial outlay for fuel to travel relatively long distances to reach suitable, deep water fishing sites. Increasing fuel prices are making offshore fishing more expensive too.

Stakeholder meetings with fishers organised by Shoals Rodrigues indicate that around half of the fishers they have talked to would be happy to work on land and half would like to continue with some form of marine livelihood.

Land-based alternative incomes include tree-planting, tree-cutting and agricultural work. Projects to encourage animal rearing and processing of meat to add value to the product have also been discussed. This sort of project would fit in well with Cordio's recommendations for alternative income projects which serve local markets rather than depending on less dependable markets such as tourism or export. An ongoing project is planting endemic plants to use in crafts

One point that Cordio's alternative livelihood work emphasised was that diversification was the key rather than people having to move completely from one form of employment to another.

A potentially large problem identified by Shoals Rodrigues staff is the huge number of unregistered fishers – estimated at around 2000 people. These fishers tend to fish on a more casual basis and are not eligible for the bad weather allowance. Whilst alternative income and compensation projects will be targeted at registered fishers, the impact of marine reserves on unregistered fishers needs to be considered. Hopefully the Soc Mon survey of Rivière Banane will give a local insight into the problem of unregistered fishers.

Enforcement

At almost every meeting regarding marine reserves stakeholders raised enforcement as an issue of concern. Many fishers do not have complete confidence in enforcement of current fisheries management measures and are concerned that lack of enforcement will undermine marine reserves.

One option that has worked well elsewhere is to involve local fishers in marine reserve enforcement, often as community rangers. These rangers may patrol the reserve and have an educational role, with the back up of Police, Coastguard or other enforcement authority when it is necessary to make arrests.

In stakeholder meetings around half of those expressing an opinion supported the use of local rangers recruited from the fishing community. This option was more popular with octopus fishing women than seine net fishing men.

Other issues for future consideration

In Lucy Jacob's assessment of the habitat types within the Anse aux Anglais marine reserve, she emphasised the poor quality of large areas of the reserve, damaged by a combination of anthropogenic and natural impacts. To enhance the functioning of the marine reserve it may be useful to look at small scale restoration techniques that could be used within the reserve once it is up and running and being managed effectively. This would have to be a well thought out project but could be developed as an alternative livelihood scheme. The idea of lagoon restoration could be investigated initially by an MSc student or volunteer so that when the reserves are functioning ideas for restoration work will be well-developed.

Mapping the marine reserves

The site characterisation work to produce more detailed maps of the marine reserves, showing clearly the areas, which are badly degraded and the good areas that may be attractive to snorkellers and divers, needs to be continued. This should be relatively easy for the two small reserves (Anse aux Anglais and Rivière Banane) but will be more difficult for Grand Bassin and Passe Demie. It may be necessary for more than one MSc project per site – either dividing biological and socio-economic work between two people or dividing the site into two or more parts to study.

This information will also help inform the decision making process on how to zone areas within the marine reserves and how to manage recreational and other activities that will be permitted in some areas of the marine reserves.

Site visits to marine reserves with stakeholders and decision-makers

Lucy Jacob's MSc thesis revealed some discrepancies between actual habitat and species present at sites with the marine reserve and what fishers and decision-makers believed was there. Suggesting site visits with the option for viewing underwater using perspex-bottomed buckets and snorkelling for those who prefer would be a chance for all involved to improve their understanding of that is there and how best to manage it.

During the last stakeholder meeting with Rivière Banane fishers, attended mainly by octopus fishing women, the fishers were keen to snorkel in the reserve and Shoals staff offered to take them. This kind of venture will really help improve understanding of the issues involved in managing the marine reserves.

This technique has been used successfully in other marine reserves.

Stakeholder workshops

To ensure that all stakeholders are aware of the plans for the marine reserves and can contribute to decision-making stakeholder workshops could be suggested to the Co-ordinating Committee for Fisheries and Marine Resources. These workshops could be held with representatives of all relevant stakeholders - representatives of all the different user groups and other local interest groups, and would ideally include some sort of site visit as suggested above.

Shoals Rodrigues staff knowledge of the communities could help in the identification of stakeholders and the organisation of such a workshop, but it would need to be supported by and attended by members of the Co-ordinating Committee for Fisheries and Marine Resources so that they could hear the concerns and ideas of the communities directly and answer their questions about management, enforcement and alternative incomes.

Plans for 2006 and what was actually achieved

These were my planned activities for my trip in April 2006 and notes on what was actually achieved:

1. Visit each of the four northern reserve sites for a reasonable amount of time and snorkel/dive to see features of interest (identified in site selection criteria reports for each site).

This was successfully achieved and gave me a valuable overview of habitats and species at the marine reserve sites and in adjacent areas.

The following site visits were made

- (a) Grand Bassin Reef Slope (Dive) 19°39.381, 63°21.366
- (b) Passe Demi Reef Slope (Dive) 19°42.515, 63°17.562
- (c) Rivière Banane Aquarium (Snorkel): 19°40.362, 63° 28.590
- (d) Passe Cabri (Snorkel) inside reserve 19°39.684, 63°26.266
- (e) Caverne Provert (Snorkel) outside reserve 19°40.021, 63°26.068
- (f) South Île aux Cocos (Snorkel) outside reserve 19°45.122, 63°17.869
- (g) Passe Demie (Snorkel) inside reserve 19°42.600, 63°17.824

2. Contribute training and public lecture(s) as appropriate to a broad range of stakeholders

I gave a presentation on marine reserves to Club Mer and a presentation on “Key issues in marine reserve development” to an audience of members of Co-ordinating Committee for Fisheries and Marine Resources and representatives of Shoals Rodrigues. The powerpoint presentation is provided and additional handouts included the Alternative Incomes issue of MPA News and the relevant chapters of Roberts and Hawkins (2000) “Fully Protected Marine Reserves: A guide”.

3. Review biological and socio-economic site selection information and identify any areas where more information may be required.

Lucy Jacob's thesis was not available during my visit but I was able to read it on my return to the Isle of Man. The approach taken in Lucy's study was to provide a biological and social baseline for the Anse aux Anglais site prior to designation. The strengths included the snapshot of fishing activity over a month of observation, important quantification of habitat characteristics inside and adjacent to the marine reserve and the assessment of stakeholders aim and expectations. The gaps were the lack of fisheries data and interviews with other sectors such as trap and line fishermen, but these are gaps that will be filled as the fish landing site monitoring with FRTU develops.

A very positive development in the collection of socio-economic data is the pilot of the Cordio Soc Mon socio-economic monitoring planned for Rivière Banane. The CORDIO project offers a well-designed methodology that will produce data that is not only useful for informing the development of the marine reserve, but will also be comparable to studies throughout the Indian Ocean, giving the work a regional context. The first Soc Mon survey is planned for June 2006 with a second one in December. Each survey will take two weeks. Rodrigues will be one of ten sites chosen for monitoring throughout the Western Indian Ocean.

The main areas of study are:

- 1. Household interviews – these will be structured interviews

2. Focus group questionnaires – these will be semi-structured interviews with key resource users
3. Key informant interviews

Emily estimated that there are around 50 households in the Rivière Banane area but the survey will also include the fishers from other communities who use the sea area adjacent to Riviere Banane. Around 75% of fishers are thought to be from Rivière Banane.

If similar studies using the Soc Mon methodology can gradually be rolled out to each of the other marine reserve sites, complemented by detailed MSc studies for each site and the development of the fish landing site monitoring with FRTU then all the main data gaps identified in last year's report will be filled.

4. Review trap and line fishery data collection and next stage in trap and line monitoring. Advise on analysis and writing up of line fishery data.

Because Shoals had only just got the go ahead from FRTU to start the landing site studies there was no data available to look at. See above for more on how this work is progressing. Continued correspondence will be needed to monitor how this work develops and what will be possible.

5. Join Shoals Rodrigues staff on seine net fishing and trap and line fishery monitoring.

I joined one net fishing trip and gained valuable insight into the methods employed. I made a number of attempts to sample fish at landing sites. Some octopus catches were sampled, but the main achievement was to make some progress on developing landing site monitoring methods which are compatible with the approach of the FRTU enumerators (see above for more details)

6. Work with Shoals Rodrigues staff to complete the fish gonad staging guide.

This is not complete and more work will be required by me to find gonad maturity guides which are more straight forward to follow. More detailed descriptions and photos of gonad stages are still needed for the key species, and the papers mentioned above give good descriptions. This year I recommend concentrating on *Siganus sutor*, then try a new species each year, working your way down the list of important species in the seine net fishery.

I will continue to search for other photographic guides to the maturity stages of fish important in the Rodrigues fishery.

7. Bring any new relevant literature to add to Shoals Rodrigues library.

I brought a wide variety of papers on key issues identified by Shoals Rodrigues staff such as the provision of alternative incomes, economic aspects of marine protected areas and effective enforcement.

Over the next year I will continue to look for relevant marine reserves and fish biology and fisheries literature and I will send copies to Shoals Rodrigues.

Emily specifically requested marine reserves literature that is available in French so I will look for that. I will continue to source case studies that tackle the key problems identified by stakeholders and managers in Rodrigues: enforcement, alternative incomes/diversification of livelihoods and compensation for displaced fishers.

I will also look specifically for case studies on how the issue of displacing illegal or unregistered fishers has been dealt with elsewhere.

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Ntiba, M.J. & V. Jaccarini (1990). Gonad spawning maturation and times of *Siganus sutor* off the Kenyan coast. Evidence for definite spawning seasons in a tropical fish. *J. Fish Biol.* **37**: 315-332.

Appendix 1: Diary of field visit 2006

Sunday 19 March and Sunday 26 March: Sourcing information for trip on alternative incomes and other key issues raised by Shoals staff.

27&28 March: Travel from Isle of Man to Rodrigues. Left IOM 10.50am on Monday 27 March and arrived in Rodrigues at 4pm on Tuesday 28 March.

Wednesday 29 March:

Met Emily, Eric and Sabrina to discuss work and plan schedule for the trip.

Went snorkelling at Aquarium (Rivière Banane marine reserve) with Emily and Natalie (MSc student). Recorded information for site overview.

Met briefly with Natacha, Runolph and Liliana to plan education activities. Plan a talk for Club Mer and meeting on educational posters for minimum landing sizes.

Wrote up notes and caught up with new reports and new Shoals and Rodrigues MPA developments.

Thursday 30 March:

Planned to go seine net fishing but it was cancelled at the last minute. No meetings possible at Shoals or elsewhere because of national holiday.

Took day off to visit South and East of Island.

Friday 31 March:

Dive at Grand Bassin (with Sydney doing reef monitoring) followed by snorkel at Grand Bassin.

Wrote up dive and snorkel notes.

Saturday 1 April.

Went out in boat with divers out from Port Mathurin.

Computer work and reading new Shoals reef and fisheries monitoring reports etc

Sunday 2 April.

Report reading and preparing talks and other materials.

Moved from Pointe Monier to Foulsafat.

Monday 3 April.

Met Sylvio Perrine of FRTU along with the fisheries enumerators, Tolbiz, Gaspard and Milazar to plan fisheries landing site monitoring.

Met with Emily and Eric afterwards for more updates on developments and to find out about ongoing initiatives like Soc Mon.

Meeting scheduled for 2pm with Mr Genave and Mr Pierre Louis was postponed at the last minute.

More discussions with Eric and Emily (Eric was going to Mauritius so it was my last chance to see him on this trip).

Continued preparing presentations and other materials on alternative livelihoods and other key management issues.

Tuesday 4 April

Meeting at 8.30am with Mr Thomas Genave at the Rodrigues Regional Assembly.

Dived with survey dive team inside the marine reserve at Passe Demie. Went in small boat out of Baie du Nord so took all day.

Wrote up dive notes and continued work on presentations.

Wednesday 5 April

Worked at home in the morning preparing lectures and reading papers for the lectures.

In the afternoon went into Shoals to print out some documents etc
Snorkel at Passe Cabri, inside and outside the marine reserve.
Reviewed old trap fishing studies and looked at forms the enumerators currently use.

Thursday 6 April

Had planned to go to fish landing site for catch monitoring but the enumerator we were going to join was off sick.
Instead went seine net fishing with a group from Baie Du Nord.
Returned at around 3pm and worked on some gonads and producing a photographic record.

Friday 7 April

Went first thing with Jovani to Grand Baie, to work with Gaspard, one of the enumerators from FRTS on the line and trap fishery sampling. Waited until 10am, talking to fishermen and talked to Jovani about gonad work and other fish and fisheries research, and his ideas from the stakeholder meetings on marine reserves.
Gaspard was unable to make it so met with Sylvio to reschedule landing site monitoring work.
Talked to Liliana and Runolph about their small fish posters and discussed some ideas and arranged another meeting to discuss this on Monday.
Talked to Sabrina about marine reserves and other work and planned next week's activities with Sabrina and Emily.
Meeting with Jean Rex Pierre Louis at Port Sud Est. Productive meeting getting more of an update on the progress of the UNDP Marine Park project. Organised a time for a presentation on marine reserves and issues like alternative livelihoods

Saturday 8 April

Presentation on Marine Reserves to Club Mer. Organising information on computer and finding necessary reports etc, photos for alternative livelihoods presentation. Downloaded gonad photos from camera and other office tasks.
Worked at home in the afternoon, writing alternative livelihoods talk and handout and report etc.

Sunday 9 April

Day off to visit Île aux Cocos.
Worked in the evening on alternative livelihoods handout

Monday 10 April

Went to immigration to extend visa.
For rest of day worked at home on alternative livelihood presentation, report etc.

Tuesday 11 April

Went to Anse aux Anglais at 8am with Jovani to meet fisheries enumerator to assess line and trap catches. Enumerator didn't turn up. He said that fishermen wouldn't be bringing back their catches until 2pm and he finished work then. We arranged to meet him on Thursday at 8am instead.
Returned to Shoals and talked to Sabrina about trap sampling situation.
Prepared some information on minimum landing sizes and relative fecundity of fish for the small fish poster.
Met with Liliana and Runolph to discuss small fish poster.

Wednesday 12 April

Some office work – gathering info, setting up talk for Friday
Snorkel at Passe Demie, inside the marine reserve between Île aux Sables and Île aux Coco and south of Île aux Coco.

Brief meeting with Emily to get some information for report and to talk about Friday's presentation.

Wrote up notes on snorkel.

Thursday 13 April

Went to the fish landing site at 8am. Gaspard turned up at 8.30 and said that there wouldn't be any fish coming back to Anse aux Anglais today. Had the chance to talk to some octopus fisherwomen while he was there and also had a good discussion of which sites would be most suitable to work with the enumerators at.

Continued working on presentation and accompanying material.

Friday 14 April

Presentation to FPRS, FRTU and Coastguard. Translated by Sabrina.

In the afternoon I gathered final bits of information and had final talks to Emily and Sabrina about trap fisheries sampling etc.

Saturday 15 April

Packing, organising information and afternoon off.

Sunday 16 April

Flew out of Rodrigues at 9.30am.

Saturday 22 and Sunday 23 April

Report writing and sourcing references for trap, gonad and marine reserves work.

Saturday 29 April

Sourcing marine reserves information and report writing

Monday 1 May – Report writing

Saturday 13 May

Reading Lucy Jacob's thesis, report writing and sourcing information

Sunday 14 May – final report writing, photocopying references and handouts.

Appendix 2:



Minutes from Stakeholders Meetings 2006

8th February 2006 12:20 – 13:25 Rivière Banane
Attended by 22 fishers from Rivière Banane (8 men and 14 women).

Sabrina Desiré (SD) opened the meeting, welcomed everyone and explained the reason for our visit. She talked about the progress of the reserves and showed them a map of the reserve boundaries as well as the Shoals Rodrigues marine reserves poster.

SD asked if the fishers had seen the buoys. They replied that they'd seen 1 buoy inside the lagoon at Passe Grenade and thought it was OK.

A fisherman asked if they'd be able to walk through the reserve or if boats could cross it? SD replied that no fishing or catching octopus would be allowed in the reserve, however that boats could pass through it and that diving and snorkelling would be allowed with a permit.

One of the fisherwomen wanted to confirm the size of the reserve – she was shocked that the reserve stretched so far north and was annoyed as she said that's where she catches most fish, so what would she do if she couldn't fish there? SD reminded them that they'd suggested the area as a reserve.

One of the fishermen asked how long it would be a reserve. SD replied forever.

The fishers said that they would need compensation as fishing is their livelihood.

SD asked about policing the reserve and what they thought about them being paid to police the reserve themselves. They didn't think it was a good idea and said that it should be the National Coastguard (NCG) or the Fisheries Protection Service (FPS). They also said that the reserve should be policed during the night as well as in the day.

SD asked how much compensation they'd want. All the fishers agreed 3,000 Rs per month plus their bad weather allowance.

SD asked how many of them also farm. The fishers replied that not all of them farmed and farming and fishing depended on the tides.

SD asked whether they thought that fish and octopus catches had declined. The fishers replied that they hadn't caught any octopus since January. They also said that tourists broke their basket traps and release the fish in "Aquarium" and that young people also visit the area to fish and earn a living (non-registered fishers).

SD asked what they'd consider doing if they couldn't fish. Some said there's nothing else as fishing is what they've done all of their life; they also said that they couldn't all farm. The men said that they would consider off-lagoon fishing, but they didn't have the money to buy the boats and where would they moor them? SD asked about using octopus pots, but they didn't like the idea as they said it would be dangerous in bad weather and they also thought that other people would take the octopus from the pots. One fisherwoman suggested beach cleaning and the other woman said they would be happy to do this. The fishers also said that

the Rodrigues Regional Assembly (RRA) should start up an enterprise so that they can find employment as well as being paid some form of allowance.

SD asked where most of the fishers who fish in the reserve area come from. They replied that some come from Grand Montagne, Trefles, Brulé and Roche Bon Dieu, but that approx 75% come from Rivière Banane itself. They said that there are around 80 fishers in total [NB. FPS has a list of 100 fishers].

SD closed the meeting, thanked everyone for coming and suggested that they come snorkelling with us, so that they could see the "Aquarium" for themselves – all seemed keen.

14th February 2006 8:30 – 9:10 Anse aux Anglais

Attended by 34 fishers from Terre Rouge, Roseaux and Creve Coeur (33 women and 1 man).

Jovani Raffin (JR) opened the meeting, welcomed everyone and explained the reason for our visit. He talked about the progress of the reserves and showed them a map of the reserve boundaries.

JR asked if the fishers thought the reserve at Anse aux Anglais was a good idea and if it's in a good place. He got no response, although one woman nodded that it was a good idea. JR explained that the reserve will be a "No-Take Zone" i.e. they won't be able to catch any fish or octopus within the area and he showed the Shoals Rodrigues marine reserves, explaining the benefit of reserves.

The fisherman asked if the reserve would block him from going to the area north of Grand Baie and how far offshore it would start. JR explained that the reserve starts approx 500m offshore, so they would still be able to walk in the inshore area.

JR asked again if they thought the reserve was a good idea. One fisherwoman said that she hadn't caught anything that day and so yes, the reserve would be a good thing.

The fishers asked who would police the reserve. JR asked who they thought should police it and what they thought about them being paid to police it. The fishers laughed and said that them policing it themselves wasn't a good idea as they would fish illegally. One fisherwoman suggested that Shoals police the reserve.

A fisherwoman asked what they would do, as that area is where they catch the most fish and octopus. She said to the west of the reserve area (just offshore from Anse aux Anglais) the coral's broken and there's nothing, whereas it's much healthier within the reserve area. She asked how she would earn her livelihood and support her children and said that there'd be 150 fishers all fishing on top of each other in a very small area.

JR asked if they'd consider doing anything else other than fishing. They were all keen to clean beaches, but laughed at the idea of taking tourists out in the lagoon. The fishers said that it's the tourists who take things from the reef when they go diving and snorkelling. JR said that if that's the case then it would be their job to report this to the authorities when the reserve were in place, but the fishers laughed and said that the FPS officers also fish illegally, so what was the point.

The fishers said that they would want compensation and all agreed on 5,000 Rs per month.

JR asked if they did anything else other than fish. The fishers replied that they fish every day except for Sunday. When it's low tide they look for octopus, when it's high tide they line fish. Some fishers reared pigs, however the RRA has now stopped sending livestock to Mauritius – they used to get a good price for pigs but now they get nothing. They also said that they don't have enough land to rear goats or to grow crops.

JR asked if there were anymore questions. One fisherwoman asked what would happen if the reserves were set-up, but the RRA didn't give them any compensation for 1-3 months, what would they do then? She said that next time there was a meeting we should bring someone from the RRA and FPS with us to answer these sort of questions.

JR closed the meeting and thanked everyone for coming.

21st February 2006 12:00 – 13:00 Baie aux Huîtres
Attended by 2 fishers (both men).

Eric Blais (EB) talked to Peter (a seine net fisher). Peter thought the reserves were a good idea, but he thought that Shoals should manage and look after the reserves and not FPS as he said there's too much corruption. He also thought that the fishers should police the reserves in collaboration with Shoals as they know the area well, know the people and when they'll go out fishing., he was very concerned about security of the reserve and said it needed fencing of some sort, not just marker buoys and suggested that the enforcers had cameras to obtain proof of illegal fishing.

EB asked him if he thought the reserve at Grand Bassin was in a good place. He replied yes, even though that's where he fishes the most, but he said that it should be larger, stretching from the coast offshore.

EB asked if he'd consider doing anything else and he was interested in off-lagoon fishing, however he said that fishers would need to be given more facilities and training.

SD talked to Z'ecoute (line and trap fisher). SD asked him what he thought about the reserve at Grand Bassin. He thought that the reserve was a good idea and in a good place. He said that there used to be lots of fish in the bay, but that there weren't anymore and that this was due to sedimentation, so the bay should be dredged. He thought that the fishers should police the reserve themselves in collaboration with FPS.

EB and SD asked how we could encourage more fishers to attend a meeting. They replied, only if we offered money, food or alcohol!

24th February 2006 15:00 – 16:00 Baie du Nord
Attended by 23 fishers (all men)

Eric Blais (EB) opened the meeting, welcomed everyone and explained the reason for our visit. The fishers agreed that they caught very small fish and so the reserve would be a good idea.

SD talked about the progress of the reserves and showed them a map of the reserve boundaries. She asked if they thought that the reserves were in a good place. The fishers said that they catch most of their fish and octopus within the Grand Bassin and Passe Demi reserves, so if those areas were closed, where would all the fishers go to earn their livelihoods? EB and SD explained the purpose of marine reserves and showed them the Shoals Rodrigues marine reserves poster.

The fishers pointed out that the reserves would need to be policed and said that they could act as enforcers in collaboration with the NCG and FPS.

SD asked them if they'd consider doing anything else if they couldn't fish. They were all interested in off-lagoon fishing, however none of them have fished off-lagoon before, so they would need proper training. They would like a big boat with a GPS and other equipment and would prefer to fish the banks for periods of 1-2 months. SD asked if they would consider

taking out tourists, however they said that there aren't enough tourists (hotels are closing down) and so they wouldn't make enough profit.

The fishers said that they would need compensation and asked for 8,000 Rs per month. They said that there'd be no solution without this compensation. If they were given this money then they would respect the reserves and not fish within them, however if they weren't given any compensation then the RRA would have to provide for their families and they would have to fish illegally.

EB stressed again the need for the reserves and the fishers said that fish stocks are declining because more people are going out fishing and there are lots of unregistered fishers who should be made to stop fishing. They said that when young people leave school there are no jobs for them, so many go out fishing to earn some pocket money. The fishers stressed that this would get worse and worse each year.

EB closed the meeting and thanked everyone for coming.

25th February 2006 12:20 – 13:05 Shoals Rodrigues Centre

Attended by 6 pleasure craft boat owners

Eric Blais (EB) opened the meeting, welcomed everyone and explained the reason for our visit. He talked about the progress of the reserves and showed them a map of the 4 reserve boundaries.

The boat owners were concerned that they wouldn't be able to take tourists out snorkelling and said that they wanted snorkelling to be permitted in all 4 reserves. They were also concerned about access to Île aux Cocos and EB reassured them that this would not be affected.

The boat owners asked who would police the reserve and laughed when EB said that it would be FPS and NCG as they felt it was a waste of time due to too much corruption. They thought that Shoals should police the reserves with FPS and NCG as back-up.

EB asked whether they thought that permits were a good idea and whether they'd be willing to pay extra (e.g. 400 Rs per day). They said yes, but for that they'd want a proper channel to Île aux Cocos, so that they'd have access at all states of the tide. They also asked for access to Île aux Sables – they said that although Île aux Sables is closed to tourists, there's lots of litter on the beach (empty wine bottles etc), implying that people go there, so the island should be opened up to tourists as well. They also said that there's a problem getting permits from the Central Administration as it's closed on Saturdays and Sundays, so there would need to be a solution to that.

The boat owners asked if there'd be permanent mooring buoys for boats and said that these would have to be very secure as people would steal them.

EB asked, if they thought the reserves were a good idea and they all agreed that they were a good idea and said that they would respect them.

EB closed the meeting and thanked everyone for coming.

21st March 2006 17:15 – 17:35 Baie Malgache

Attended by 5 fishers (all men)

Eric Blais (EB) opened the meeting, explained the purpose of marine reserves, the need for reserves in Rodrigues and a bit about the history of the marine reserves project. He showed

the fishers a map of the 4 reserves boundaries and explained that they would be “No Take Zones”.

EB asked if the fishers thought the reserves were a good idea. All fishers thought that the reserves were a good idea and in a good location. Eric cited the example of how well marine reserves had worked in St Lucia.

One fisher asked if they would still have the right to go through the pass at Grand Bassin to get out of the lagoon? EB explained that our role was working in collaboration with the RRA and that we'd pass on the fishers wishes and views to the Coordinating Committee, so this would be highlighted.

EB asked if they caught more fish inside the reserve area or outside. All 5 fishers said that they fished within the Grand Bassin reserve and caught most fish in this area.

EB asked if the fishers had noticed any change in fish/octopus catches in recent times. All fishers said that fish and octopus had decreased and that they'd only catch 1-3 octopus each day if they were lucky.

EB asked if they'd consider doing anything else other than fishing when the reserve areas were closed. The fishers replied that they have to fish – they don't know anything else. They all agreed that they would respect the reserves however and would just have to find somewhere else to fish.

EB asked if they have any other means of income. They all replied, No, they only fish.

EB asked who should police the reserves. The fishers thought it would be a good idea if a group of fishers were paid to police the reserves with back-up from FPS and NCG.

The fishers all agreed that we need reserves and that they're a good idea and said that if all the fishers respect them, then they will work. EB explained how successful reserves had been in Australia and they all hoped that the same could happen in Rodrigues.

EB asked if there were any more questions. One fisher asked that beacon lights be placed at the entrance to passes to allow them to return back into the lagoon safely.

EB closed the meeting and thanked everyone for coming.

28th March 2006

Anse Goeland

Attended by 11 fishers (all men)

Eric Blais (EB) opened the meeting, explained the purpose of marine reserves, the need for reserves in Rodrigues and a bit about the history of the marine reserves project. He also showed the fishers a map of the 4 reserves boundaries”.

The fishers pointed out that there are approximately 60 registered fishers who fish in the Grand Bassin reserve area.

All of the fishers thought that reserves were a good idea, however they were concerned that they would still be able to use the pass at Grand Bassin to get out of the lagoon. EB explained that they would be able to pass through the reserve area, but that they wouldn't be able to catch anything.

One fisher said that he had been fishing at Grand Bassin for years and that there has been no change in his catch. He said that he will continue to fish there, even if it is a marine reserve and that the authorities would have to shoot him before he stopped.

Another fisher said that they needed compensation if they wouldn't be able to fish there and asked for 8,000 Rs per month, only then the reserves would be able to be put in place. All of the fishers agreed that it would be very difficult for them if Grand Bassin was a marine reserve as they all fish there and always catch something within that area. One fisher pointed out that he wouldn't get any compensation as he isn't registered and so asked what would happen to him.

Another fisher said that the seine net fishery should be closed during the season when Mulet lay their eggs as catches of this fish are declining. The other fishers all suggested closing the seine net forever. Eric explained that it would be very difficult to close the fishery forever, however the fishers argued that the seine net fishers are able to survive during the 5 month closed season, so should still be able to gain some livelihood if the fishery is completely closed.

The fisher who asked for 8,000 Rs compensation volunteered himself to police the reserve. Another fisher said that they are keen to do other jobs inland such as beach cleaning or re-forestation.

The fishers were concerned that their propellers could become caught on the marker buoy lines when they were returning to the lagoon at night and suggested that there also be beacon lights to mark the reserve area.

EB closed the meeting, thanked everyone for coming and said that he would pass their concerns onto the Rodrigues Regional Assembly. The fishers asked him to come back to them with feedback.

General Conclusions

- All fishers agreed that marine reserves are a good idea in order to protect the fish stocks in Rodrigues.
- Fishers were very concerned about how they would earn a livelihood when the reserves areas are closed as they catch the most fish/octopus in these areas.
- Most fishers would be happy to do other jobs such as beach cleaning or re-planting, however for off-lagoon fishing they would require boats, equipment and proper training.
- Most fishers asked for compensation for loss of earning, ranging from 3,000 – 8,000 Rs per month. If they do not receive compensation, they say that they will have to fish illegally in order to feed their families.
- All fishers were very concerned about enforcement of the reserve areas and who would police them. Many thought that it would be good for a group of fishers to police the reserves in collaboration with the FPS and NCG.

Other Concerns:

Fishers were concerned that they would still be able to pass through the reserve areas to go outside the lagoon or to other fishing grounds outside of the reserve.

Fishers asked for the areas to be marked by beacon lights so that they could locate them, when they were returning to the lagoon at night.

Tour operators were concerned that they would still be able to take tourists snorkelling and diving in the reserve areas and asked for permanent mooring buoys and access to Île aux Cocos at all states of the tide.