

Chagos News

*The Periodical Newsletter of the
Chagos Conservation Trust*

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EDITORIAL

Possibly the most important event for CCT in its history to date, is the issue by the government of the Consultation document on proposals for the Chagos Protected Area.

There is an old Chinese saying which, in its three parts, goes: *May you come to the attention of those in authority; May you find what you are looking for; and May you live in interesting times.*

Well, for CCT this is exactly what we have been waiting for! Our long time efforts for the conservation of Chagos have certainly come to the attention of those in authority, resulting in the FCO issuing this document, of which there is more information by Charles Sheppard in this issue.

We certainly hope to find what we are looking for and, for many complex reasons, these are certainly interesting times.

The Chinese saying has sometimes been used as a curse. If this applies here at all it perhaps relates to the huge amount of work put in by many in CCT to bring this about. But this is what we wanted all along.

Whatever happens about potential political outcomes regarding any future administration of the archipelago, it is clear that maintaining the archipelago in its present excellent condition must be a good thing for everyone. We hope that all CCT members will vote for the creation of

what will be the most important marine protected area in the Indian Ocean, perhaps even the world.

The excellent condition of Chagos is of course for the most part restricted to its marine environment. But although much of the land environment has been degraded due to the coconut plantations which covered most of the islands, and because of introduced plants and rats which came with the people, many of the smaller islands were left undisturbed. These islands today contain huge numbers and densities of seabirds and have resulted in there being ten Important Bird Areas amongst the islands.

The idea to improve the condition of the terrestrial habitat was first proposed over 30 years ago, during the expeditions of the 1970s, though practical work on it started only 6 years ago with the plans to remove the rats from Eagle Island. This theme of island repair is continuing with the vegetation restoration project, described herein by Pete Carr. This will be facilitated by a greatly appreciated recent grant from the Ernest Kleinwort Charitable Trust.

An example of the integrated nature of the research on Chagos is that, to advise on this project, a senior scientist from the Royal Botanic Gardens Kew will be one of the international group of scientists participating in the *Chagos 2010* expedition in February.

Anne Sheppard

The Government's consultation on the Chagos Protected Area.

*Prof Charles Sheppard
University of Warwick*

The government's decision to issue a Consultation on the issue of whether the Chagos Archipelago should become a strictly protected area is a culmination of a long period of work by CCT, by its members and several other bodies. The Consultation was published in November, and the view of any member of the public or organisation can be recorded before February 12. The website containing information on the consultation, and how to contribute, is:

<http://www.fco.gov.uk/resources/en/pdf/21153320/mpa-consultation-101109>

In essence, there is firstly the question: should there be any protection or not? Assuming that members of the Chagos Conservation Trust think that conservation and Chagos should go together, the "yes" option then has three variants. These are: (1) total protection and a no take zone for the archipelago out to its 200 mile limit, (2) similar, but permitting fishing, and (3) protect some bits of it only, the bits being defined as the most important bits. There are various other conditions and stipulations such as that Diego Garcia and its operations must not be affected, and that any promulgation would be by BIOT law.

We all know that the relatively superb condition of the Chagos Archipelago is what has led us to this point. But before I comment on the three options, with my own view being option 1 (complete no-take), I would just like to remark that this preference is not only because I know Chagos well, but also because I know almost equally well the situation in so many other parts of the Indian Ocean. I have seen so many reef areas in the Western Indian Ocean and Arabian region, from southern Madagascar to Kuwait, and across to Sri Lanka and the

Maldives, to know that the condition of many of them is dire, and this often applies whether or not they are in a nominally protected area. People have a very poor track record of living near to reefs and using them sustainably. We know that it does not take very much to over-fish and destroy a reef system, and we also know from past history that once destroyed it is extremely difficult to repair the damage; in this respect changes in ecological condition move more like a ratchet in an old-fashioned clockwork mechanism which can only go one way, rather than being like a freely rotating wheel which can move backward and forwards. In other words where we have a good reef system we have but one chance.

First though, decisions must depend on information, and in this area there are as many incorrect assumptions out there as there is accurate information. We can find information in at least three good websites. No reader of this should need to be told of CCT's website:

<http://www.chagos-trust.org>. Much information is also available on Pew's Global Ocean Legacy website: <http://www.globaloceanlegacy.org/chagos/> which contains much information and several documents which can be downloaded. In addition, there is a new website by the Chagos Environment Network (of which more later): www.protectchagos.org. All have both information and many documents to download.

The three options for the Consultation

Let us take those three options in reverse. Last is the option to protect some bits only (Option 3). This is very little difference to what already exists. BIOT already has a number of strictly protected areas, which are good for what they do, and which are focused on the highly visible bird-rich islands. Through this option some larger areas could be included as well, though it ignores two crucial aspects: first the

need to protect the large, contiguous, reef area that in its entirety, is key to many of the benefits currently provided by Chagos and secondly, the ocean ecosystems that surround the Chagos and which are themselves rich in biodiversity. So Option 3 does not really achieve anything very much. Option 2 is for the whole area to be protected except for fishing. At the Southampton workshop which discussed the science of Chagos for two days, the requirement for fishing to continue was only endorsed by MRAG, the company currently contracted by the FCO to manage the fishery. This workshop covered the science from abyssal depths to tree-tops, it included scientists from many organisations, and had the brief to examine the scientific case for the protection of Chagos and to recommend accordingly. It concluded that there was a strong case for complete protection. The document resulting is available for download on the CCT website at: http://www.reefnewmedia.co.uk/cmt_chagos/uploads/Southampton-BIOT-workshop.pdf)

On this subject of maintaining fisheries (as would be the case with Option 2), the Indian Ocean is one of the worst documented fisheries in the world, with very poor regulation, and almost certainly with heavily overfished components within it. Given the failure of regulation to manage stocks satisfactorily, it is becoming widely accepted that protected areas, for all kinds of fish both localized and wide-ranging (sometimes called trans-boundary) are an important and complementary means of contributing to sustainability. While the intention of creating a no-take protected area around Chagos is not to enhance the pelagic and wide-ranging fish, it may well have that effect, and it would provide perhaps the only effective refuge for oceanic fish species which everywhere else are intensively hunted. Stopping the fishing would also stop the bycatch of this fishery, which runs to tens of thousands of sharks, rays and other species and would help conserve the deep water ecosystems around the Chagos, which although

unknown, are believed, based on the topographic diversity of the seabed, to be likely to be a rich and important habitat in their own right. So, the scientific conclusion reached by most, is that Option 2 is not a good one for the Indian Ocean as a whole, for the targeted tuna, or for the other species and ecosystems being disrupted by it.

This leaves Option 1 which is for a no-take protected area, possibly with an exception for Diego Garcia and 3 miles surrounding it, because of the requirements of the military facility. (However, it should be noted that Diego Garcia's reefs occupy only about 1% of those of the archipelago in any case.)

Designation of Chagos as a strictly protected area with Option 1 would create several firsts. It would be the world's largest marine protected area but, more importantly, it would more than double the World's area of 'no take' refuges for marine species. As has been said before, there is a growing recognition that every ocean needs such areas, but generally they don't yet exist. With Chagos we can take a big step to remedy that. Chagos also contains an extraordinarily high proportion of the reefs of the Indian Ocean in 'Least Threatened' condition – about one half of them in fact – all within one political unit, under one government, which has the means and ability to achieve this. Therefore, for the Government, an unusual opportunity has now arisen to take a world-leading constructive step forward – to designate the Chagos as a no-take protected area, an action that for all the above reasons, would provide widespread benefits.

The view of the Chagos Environment Network

The Chagos Environment Network (CEN) is made up of a number of the United Kingdom's main scientific societies and organizations. These are: The Chagos Conservation Trust, The

Linnean Society of London, The Marine Conservation Society, The Pew Environment Trust, The Royal Botanic Gardens Kew, The Royal Society, The Royal Society for the Protection of Birds, The Zoological Society of London, and a wide range of scientists who have visited represented by myself. Meetings have been held, along with much discussion, not only with these organizations but with others at the meeting referred to earlier at the National Oceanography Centre (NOC) in Southampton last summer. Most attending these meetings have concluded that the Chagos Archipelago definitely merits very strong protection, including from the damaging effects of the fishing industry. Certainly the conclusion of all members of the CEN is that Option 1, namely a fully no-take protected area extending out to the 200 mile limit, is the highly desirable option.

Time is not on the side of coral reefs generally. We are in an era of warming and ocean acidification, with increasing human populations exploiting ever more heavily the world's remaining reefs, leaving fewer and fewer to act as scientific examples, species refuges or reserves for the others, or as sources of useful species for depleted areas. There is of course a lot of political interest and activity stimulated by this consultation, particularly around three main issues: fishing interests, territorial claims, and the issue of the displaced Chagosians. Though these are all important, this consultation is not a referendum on history or politics; whoever will own, govern or exploit this archipelago at some time in the future, its very careful protection **now** is necessary and this will be a benefit for the future, whatever that may be. As the following paragraph states in several documents:

“Whilst the members of the Chagos Environment Network are fully aware of the legal challenges brought by Chagossian groups against the UK government, we believe these islands need conservation now and that this will be beneficial under all future scenarios.

We cannot predict the future. We believe that the Chagos Islands and their surrounding waters should be protected for the resources and values they have today. That is why we are urging that the Chagos Islands and their surrounding waters be designated as a no-take marine reserve ‘without prejudice’ to the outcome of the legal process. This designation would mean that the Chagos Islands and their resources would remain healthy no matter what the future holds.”

The scientific case is clear and full protection now would benefit any conceivable situation in the future.

We hope that you will “vote” for option 1. You can do this by either writing to:

BIOT Marine Protected Area
Consultation
Overseas Territories Directorate
Foreign and Commonwealth Office
King Charles Street
London, SW1A 2AH

Or by email to:
biotmpaconsultation@fco.gov.uk.

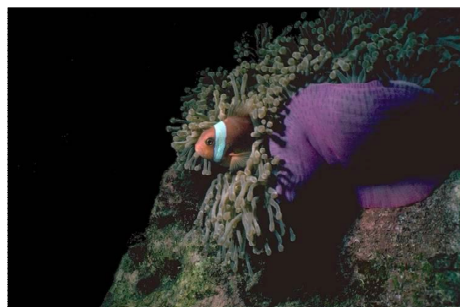


FCO CONSULTATION DOCUMENT

CONSULTATION ON WHETHER TO ESTABLISH A MARINE PROTECTED AREA IN THE BRITISH INDIAN OCEAN TERRITORY

A consultation produced by the Foreign and Commonwealth Office.

This information is also available on the FCO website: www.fco.gov.uk, British High Commission Port Louis website: www.ukinmauritius.fco.gov.uk and British High Commission Victoria website: www.ukinseychelles.fco.gov.uk



Chagos Conservation Trust Chagos Protected Area Discussion at Over-seas House 24 November 2009

The meeting began with a welcome by CCT Chairman, William Marsden, who highlighted the fact that a government-run public consultation is now open on the subject of a marine protected area (MPA) in the Chagos and that was the reason for the meeting. The day also happened to be the 150th anniversary of the publication of Charles Darwin's *On the Origin of Species*. He introduced the first speaker, Dr Carl Lundin, Head of the Marine Section of the World Conservation Union (IUCN).

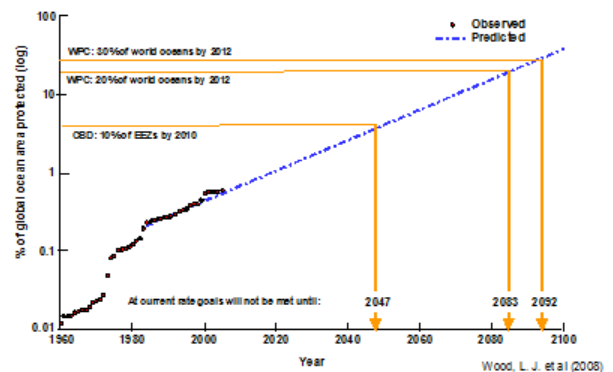


Dr Carl Lundin head of IUCN's marine programme talked about marine protected areas and the possible contribution of Chagos.

Dr Carl Lundin began his presentation with an introduction to the work that IUCN does internationally, and more specifically the work that his team does on marine conservation. He outlined the categories for protection that IUCN recognise in terms of the different types of protected areas around the world. Terrestrial protected areas now cover 13% of the global land area, surpassing a goal of 10% set 20 years ago. But the targets for marine protected areas are not on track – the Convention on Biological Diversity set a target of 10% to be protected by 2010, but this will not be achieved until 2047 at the current rate. Carl noted that while MPAs are not a substitute for good management, there was a wealth of

literature which shows that they are a tool that helps good management to be achieved. The benefits of a Chagos Protected Area would, he said, be many: enhancing resilience to bleaching events; creating a scientific reference point and restocking fish populations that will feed into the East African coast. He also highlighted the high biodiversity of the Chagos, and the fact that although climate change would have an impact on the islands, in terms of sea level rise for example, these impacts will be fewer than marine ecosystems elsewhere, so Chagos could act as a benchmark site for studying the effects of climate change. Not only would the Chagos Protected Area be the largest MPA in the world, but it would also represent 16% of the UK's total Exclusive Economic Zone, including the Overseas Territories and Dependencies. The project had the strong support of IUCN.

MPAs: Global Progress

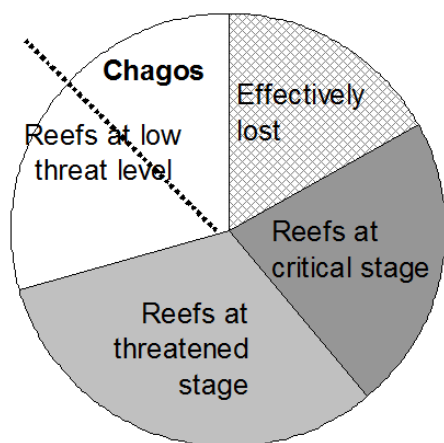


Graph of the cumulative area of the planet covered by MPAs and the dates at which the area was achieved. The lines show the targets demanded by various international conventions and the target dates for achieving them. The achievement falls well short of the targets; Chagos will add substantially to the progress.

Source IUCN

The next presentation was from Professor Charles Sheppard, University of Warwick, who noted the need to inject a sense of urgency into proceedings given the state of reefs in the Indian Ocean. Around 20% are already lost. Of the remaining reefs that are in good

condition, 49% are within the Chagos. The need was not only to ensure Chagos remained in good condition for its own sake, but for the sake of the western Indian Ocean generally – not only directly but indirectly through provision of a refuge, a reference site, and to provide information for other areas trying (often with limited success) to restore their own damaged reefs. So protecting the Chagos is an easy way to protect a large quantity of high quality coral reefs. Once damage has been done it is often very difficult to reverse, and there are few examples in the field of conservation where environmental damage has been undone. Tinkering with ecosystems will inevitably affect the goods and services that they produce, which will cause food shortages for human populations, which often leads to conflicts. Charles then mentioned research that shows that coral reefs in the Chagos are recovering from climate damage much faster than those elsewhere, and noted that nowhere else do reefs bounce back from climate change impacts quite as well as a place with no human impacts such as Chagos.



A recent assessment of Indian Ocean reefs placed each in one of four categories. Chagos provides approximately half of all the reefs in the 'least threatened' category.

Chagos wasn't in perfect condition: even the short period of habitation has had an impact on the bird and turtle populations of the Chagos and those islands that were inhabited are silent compared to noise created by the large diversity of birds (as

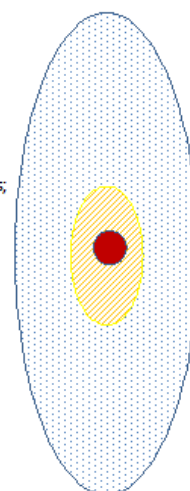
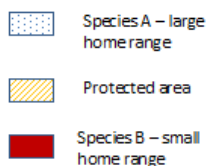
recognised by the 10 Important Bird Areas) on other islands, and turtle populations will take more years to rebuild to the numbers they were at before the islands were inhabited. He finished by noting that although climate change will affect Chagos (specifically mentioning alarming new insights from research into ocean acidification), by protecting it we can buy about 30 years which Chagos otherwise wouldn't have.

The final presentation was given by Alistair Gammell, Pew Environment Group, who stressed the importance of the opportunity that we all have to contribute to the public consultation. The consultation was launched on 10th November and runs until 12th February, and poses three options: do we want to protect the full extent of the Chagos as a no-take protected area; allow tuna fishing to continue; or just protect some parts?

The largest possible Protected Area

Larger protected areas have:

- More habitat types;
- Larger area of habitats;
- Larger populations of animals and plants;
- A larger fraction of the total population receiving protection; and
- A smaller edge effect



In terms of effectiveness, size does matter. A large well managed MPA is more effective than several small ones. The possibility to create a no-take MPA of this size does not exist anywhere else in the Indian Ocean.

Alistair explained why he hoped those present would support the first option. The Government says it is committed to marine protection and talks about "maximising the benefits" along with securing healthy natural environments "now and in the future".

In order to meet these long term goals, the best option is the creation of a fully no-take MPA. In contributing to the sustainability of coastal communities, and providing a reference point for science, a Chagos Protected Area would be “maximising the benefits”. Relationships between species are important for healthy ecosystem functioning, and so by removing a species, i.e., tuna through fishing, we are not protecting that environment. The larger an MPA the more effective it will be, as it will cover a greater portion of species’ range, and will also have a smaller edge effect.

Alistair drew on Charles Darwin’s notes from the Beagle voyage to show that Darwin had sailed through the Chagos. There could be no better way for the UK to celebrate the 150th anniversary of *On the Origin of Species* than by preserving some of the greatest biodiversity left under its jurisdiction. He encouraged all present to respond to the consultation.

Peter Bridgewater, Chair of the (Government’s) Joint Nature Conservation Committee (JNCC) and Professor Callum Roberts, University of York, then joined the three speakers for a Panel Q&A session with the audience. The first question came from Jules Azzopardi, who asked whether there was any further news on protection of the fisheries around the Chagos? Last year the Minister had felt that there were insufficient funds for protection, but one study suggested that policing fisheries could in fact be very low cost.

Professor Callum Roberts responded by saying that proper enforcement of a no-take area could not be undertaken simply using a fisheries protection vessel as happens now. He stressed that in his view a no-take MPA which excluded fisheries was the best option, as counter-arguments that claim that tuna populations do better when fished legally than not fished at all did not seem to him convincing. Callum concluded by saying that it seemed an odd idea that the only major exploitation, i.e., tuna fishing, that

happens in the Chagos now might be allowed to continue under one of the MPA proposals. Chris Mees from Marine Resources Assessment Group (MRAG) spoke, agreeing with Callum that increased protection would be needed if a no-take area was declared, but also adding that this would be at substantially greater cost. He said that illegal fishing in Chagos was currently fairly minimal, but that he would expect this to change if licensed fishing was no longer allowed.

Charles Clover, author of *The End of the Line*, then asked who owned the Chagos, what undertakings have been given to the Mauritians, and what is happening with the Chagossian legal case? William Marsden answered that since the Treaty of Paris in 1814 Chagos has been British and is presumably ‘Crown’ property. The UK Government has said that when the islands are no longer needed for defence purposes they will be ceded to Mauritius. As regards the Chagossian legal case, he noted that the Government had stated that the consultation and the decision on the establishment of a Chagos Protected Area were without prejudice to the outcome of the current the European Court of Human Rights case. That clearly meant that arrangements for the protected area could be changed in the light of the outcome of the case.

Peter Bridgewater then spoke on the need to think innovatively and not just consider an MPA as the only way ahead, and referred to Carl’s presentation in which he spoke about the many different types of strategy that IUCN use for Protected Areas. Peter Bridgewater said that an MPA without sufficient resources to manage it could be worse than no MPA at all and that we should find a solution that everyone could agree on.

Carl Lundin responded by saying that one of the tools at IUCN’s disposal is the World Heritage Convention, and that this

is a way of elevating the status of an area beyond that of national jurisdiction, so that whatever happens in the future, an area is protected. With regard to fisheries, the advent of new technologies meant that running an increased protection operation should not be too costly. Also, given that tuna were only within Chagos waters for one month of the year, we should not over-estimate the importance of this area for the fishing industry.

Dr Mark Spalding, The Nature Conservancy, announced that there would be a Workshop on 7 January at Royal Holloway College to look at the socio-economic aspects of setting up a Chagos MPA. He was nervous about backing an MPA if issues surrounding sovereignty, future resettlement and enforcement hadn't been fully considered.

Nigel Wells asked about Blenheim Reef, which is not listed as part of the Chagos group of islands in FCO documents. Charles Sheppard responded that this was probably a technical issue, given that the reef is underwater for up to 18 hours per day.

Charles Clover then asked if there was any potential for making money from the Chagos islands, and would this conflict with the military on Diego Garcia?

William Marsden answered on behalf of the CCT. This was an issue that had been discussed, not least in the view of the need for sustainable funding for protection and conservation of the Chagos. Following the Aldabra model, Chagos could potentially accommodate limited and regulated vessel-based visits (eg for diving) which would pay relatively high fees and cause little environmental harm. However access to BIOT was currently very restricted and the military would probably not welcome a significant increase in visiting

Alistair Gammell then mentioned a conversation he'd had with Pavan Shukdev of TEEB (The Economics of Ecosystems and Biodiversity) about the

fact that the benefits to humanity of protecting the Chagos are huge, but that in monetary terms, protecting it would cost almost nothing. The cost of protecting an MPA would perhaps be around 2 or 3 million pounds a year, a pathetic amount in terms of governmental budgets. We should not be afraid to make the case that, to protect such an important piece of biodiversity and manage it well, we need to fund it properly.

For the closing remarks, William introduced Andrew Allen, the Deputy Commissioner for BIOT and Eric Blencowe, Head of the International Biodiversity Unit of Defra. Andrew Allen thanked CCT for arranging the evening, commenting that it was exactly the sort of thing that was needed to help the FCO come to a decision. He stressed that they had not already done so! He noted that as well as getting representations from the environmental and scientific community, it was also important that the government hear from Mauritians and the Chagossian community, as well as anyone else with an interest in the Chagos. He said that although, legally, the government could have declared an MPA without a consultation, they had decided to consult because the issues were complex, and that they want to make sure that there is a good plan in place so that the Chagos does not simply become a "paper park".

Eric Blencoe thanked CCT for organising the useful discussion. All at Defra very warmly welcomed the official consultation. He was particularly impressed to learn that almost half of the good quality reefs left in the Indian Ocean can be found in the Chagos, and was also pleased to hear about recent work from TEEB on the economics of ecosystems and biodiversity. He noted that between half a billion to a billion people living in developing countries depend on fisheries as their primary food source, and so the importance of coral reefs was therefore immense. Eric

concluded by saying that it would be excellent if the Government would recognise 2010, the International Year of Biodiversity, by creating the Chagos Marine Protected Area.

William Marsden concluded by thanking all for attending, Coral Cay Conservation for their help with organising the evening, and Simon Hughes for masterminding the evening and for his excellent work as Secretary of CCT.



The Pew Environment Group have been essential in helping us get to this stage. Dr Jay Nelson, director of the Ocean Legacy Program, of the Pew Environment Group, attended the AGM

Chagossian Scholarships

*Pete Raines
Coral Cay Conservation*

The Chagos Conservation Trust and Coral Cay Conservation (CCC) have teamed up to offer 'CCC Scholarship' training opportunities for Chagossians. Two Chagossian scholarship placements are offered to the large Crawley-based community in the UK which took the initiative in arranging discussion on conservation. These four-week scholarships include: PADI Scuba and an intensive CCC Skills Development Training Course in coral reef ecology, species identification, reef surveying, data management and marine protected areas. The successful candidates will then join a CCC project in the Philippines this year.

Chagos MPA Networking

Many different and prestigious organisations are helping by announcing the Chagos MPA consultation in their websites. A selection of them are -

The Natural History Museum International Year of Biodiversity website
<http://www.biodiversityislife.net/?q=node/248>

The Chagos Environment Network petition sites
<http://www.thepetitionsite.com/takeaction/271759692>
and
<http://www.protectchagos.org/>

The PEW Charitable Trust website
http://www.pewtrusts.org/news_room_detail.aspx?id=55984

The PEW Global Ocean Legacy website
http://globaloceanlegacy.org/newsroom/release_10nov2009.html

The IUCN MPA website
<http://blog.protectplanetoocean.org/2009/11/consultation-to-protect-british-indian.html>

The Coral Cay Conservation website
<http://www.coralcay.org/content/view/full/787281/>

The British Ecological Society website
<http://britishecologicalsociety.org/blog/blog/2009/11/25/conserving-the-chagos/>

There have also been a lot of articles written in newspapers, newsletters and journals.



CCC, CCT and Chagossians at the recent meeting in Crawley.

Working Towards Atoll Restoration

Part one – Preparations

*Major Peter Carr RM
Executive Officer
British Party Diego Garcia*

I have now spent ten months working on Diego Garcia and in this time I have visited the outer atolls of BIOT on eight occasions. As I write this article on a Sunday night in August, I am sailing back overnight from Brit Ops to Diego Garcia, in preparation for work on Monday morning. It seems an appropriate time, as the *Pacific Marlin* rocks and rolls its way south into the winds, to put down on paper what I have learnt about atoll restoration work since being stationed out here in BIOT. The conclusions I draw on this topic do not surprise me. As with the military challenges faced when stationed on this idyllic tropical island (as far away from the mainland as is possible in the Indian Ocean) I realised how logistically and physically challenging conducting atoll restoration work in BIOT really can be. This should not be underestimated when tackling any of the three main areas of restoration work in the Territory.

In simple terms, the major part of atoll restoration in BIOT requires three separate work strands. These are: the removal of coconut trees from the plantations coupled with the replanting of native hardwoods; the removal of shore line debris (this being an ongoing task); and the eradication of rats. Achieving these three goals would restore the islands from the anthropogenic impacts they have suffered, and still suffer, from the plantation era. The obvious benefits of atoll restoration are: to increase the probability of (re)colonisation by the species of internationally important seabirds that breed elsewhere in BIOT; to increase fecundity of the two species of endangered turtles; and to potentially increase the overall terrestrial biodiversity, particularly of invertebrates.

Up until my arrival on island, BIOT had no procedures in place to tackle these tasks on a regular basis in the outer islands. In an effort to establish both a precedent for atoll restoration work in BIOT and an appetite for its continuation, I have initiated and continue to work on projects involved with all three themes. What follows is a précis of the lessons learnt from the initial phase of these endeavours.

Shoreline Debris Removal

Shore line debris significantly affects all of the BIOT atolls. Apart from being exceedingly unsightly, on some beaches breeding turtles are adversely affected by the amount of rubbish present, for example, on parts of Ile des Rats in the Egmont Islands. Simply put, on the worst affected beaches, the turtles have to scrape away flip-flops, plastic water bottles and fishing buoys before they are able to reach sand for their breeding pits.



Dead turtle trapped in discarded fishing net.
Photo Martyn Dorey

On a positive note, it has been inspiring to witness the compulsory and voluntary work being undertaken on Diego Garcia to keep the beaches free of debris. In and around the Naval Facility, the removal of rubbish that has been washed up is contracted work and happens routinely. Along the shore line away from the facility, "Earth Day" beach clean ups take place normally four times a year, when up to 100 people, both military and civilian, turn out to clean specific, accessible stretches of the ocean-side shore line and are rewarded for their efforts with an event T-shirt.

In addition to these organised events, individuals or groups of individuals sometimes take it upon themselves to clean specific beaches. One such effort of note in 2009, taking place on ocean-side beaches in the south and eastern side of Diego Garcia, is that Martyn Dorey. He has removed by himself (on his days off over a four month period) some 350 fishing buoys and 200 bags of rubbish, in addition to lesser numbers of truck tyres, oil drums, ropes, etc. Some of the debris is being recycled or sold on and the money raised is being used for other environmental projects. Diego Garcia is recognised as the most important breeding atoll in BIOT for turtles, thus this work is greatly improving the habitat available for them.

After discussion with Dr Chris Hillman of CCT about methodology, I attempted a “scientific” (i.e. repeatable) beach clean up of Sea Cow: a rat-free Strict Nature Reserve on the Great Chagos Bank. With assistance from both UK and US Service personnel and in an effort to further the study of the origin of shore-line debris, I established two transects on this island. I undertook this in April 2009, when I diligently marked out and recorded these transects, collected and recorded how many flip-flops, plastic water bottles and fishing buoys (amongst a few other assorted waste items) were in the transects, before shipping the rubbish back to Diego Garcia for disposal.

Three months later, I landed back on Sea Cow prepared to repeat the count of the transects, in expectation of gathering data to facilitate the analysis of the quantity of accumulated rubbish within a measured timeframe and even possibly to discover its origins and how that relates to ocean gyres and currents. It was with much disappointment that, on revisiting the site, I discovered that the entire shoreline had changed shape. The two transects I had so assiduously marked and recorded were now below the waterline: the whole coastline had moved “in land” by five metres in three months.

There were to be more lessons learnt from this experience than just the suitability of site selection. Ferrying bags of rubbish off islands through crashing surf to waiting small craft is not for the faint-hearted or poor swimmer: bagging and securing the rubbish requires some thought to prevent bags ripping or floating away. Lifting a raft of fishing buoys into a small craft that is awash with waves, yards from a coral reef that will rip the bottom out of the boat, is not for a weak or inexperienced coxswain. Storage facilities on the mother-craft, in my case the BIOT Patrol Vessel PACIFIC MARLIN, also need to be thought through to prevent bags being washed away in heavy seas. Transport ashore in Diego Garcia, disposal or recycling and shipping off Diego Garcia to mainland facilities have to be agreed, funded and negotiated. What on the surface appears to be a simple endeavour, can actually be dangerous, physically demanding and a logistical challenge.



Preparing a boatload of collected rubbish for a trip through the surf back to the ship.

Photos Jordan Orr

To end, as started, on a positive note, shore line debris removal is now a

standard practice on Brit Ops due to the groundwork that I have put in. Issues we initially experienced and found ways to overcome during the past ten months have now ensured there is a tried, tested and robust system in place to remove debris from an island, completing the cycle with its processing once back on Diego Garcia. The most positive aspect of shore line debris removal is that all those involved in the project have expressed a sense of pride and purpose in their role of the stewardship of the islands.



Preparing to take the collected rubbish off the islands. *Photos Andy Williams and Lisa Kedding*

Rats

Rats, another legacy of plantation times, have also proved to be a challenge when seeking their eradication in the outer islands. As the ecological scourge of BIOT, their presence (or absence) has a huge and well documented impact upon island biodiversity and rejuvenation. I presumed that what I had read about where (on which islands) the rats were situated was immutable and never changing, but over the ten months out here, I have come to question some earlier records of which islands currently

support rats. This question arose because I found it staggering to see the vast differences between rat-infested and rat-free islands. This has also become a lively talking point with visitors to BIOT. Approaching a rat-infested island by boat, there is an eerie silence: there are no birds circling over the island and very few birds in the surrounding seas. Approaching a rat-free island like North Brother is a completely different experience however. The surrounding seas abound with bird life. Shearwaters, noddies, boobies and terns loop and circle past and over the ship. These islands are truly alive with the cacophony of different bird calls. The most obvious sign when alighting ashore on rat-free islands (if timed correctly) is the concentration of terrestrial breeding terns. These can be present in their thousands.

The BirdLife International agreed Important Bird Areas of the Great Chagos Bank, which include all of the islands, are known to be rat-free (except the ex-plantation rat-infested Eagle Island). Therefore, the thousands of breeding Sooty Terns on South and Middle Brother in July this year and the ground breeding colonies of Brown Booby on North Brother, Danger and Nelsons Island throughout the year are all to be expected. The huge Sooty Tern colonies on the islands of Peros Banhos, all thought to be rat-infested, are more surprising. Although Sooty Terns are known to breed on islands with rats (rat-infested Ascension Island being one enormous Sooty Tern breeding area I have previously been involved with monitoring), the tiny islands holding the big Sooty Tern colonies on Parasol and Petite Coquillage, had me wondering. Such small islands holding so many breeding birds should show signs of rat predation of the eggs and small chicks. Furthermore, there should be evidence of rodent gnawing on fallen fruit. I have detected neither of these indicators in my investigations and surveys.

The suspicion that there were no rats present on some islands in Peros Banhos led me to start laying baited snap-traps overnight and have my teams inspect the islands by torchlight throughout the night in order to gather up data on the presence or absence of rats. To date, I have inspected (for the presence of rats) all of the Strict Nature Reserve islands in Peros Banhos at least four times: two man teams have searched the islands by torchlight on at least three nights and all of the islands have had at least four nights with 50 baited traps left, which were checked promptly the following morning. As a “training exercise”, I have had teams lay traps and inspect known rat-infested islands. The results of these training excursions are encouraging, for example with 10 baited traps on Ile Sudest (Egmont Islands) seven rats were killed in one night and on Iles Manöel and Yéyé, every visit by Brit Ops teams reported visual sightings of rats.

In no way do I claim to be a specialist in rodent detection and I freely admit the methodology adopted for this project can not be claimed to be rigorously scientific (time and resources dictated a pragmatic approach). Furthermore, in BIOT, as documented in the Eagle Island eradication attempt, crabs on oceanic islands fill the same ecological niche as rats in their scavenging capacity and most certainly skew baited trap results. I would still hypothesise that rats are NOT present on Ile Parasol and either of the two Coquillages. Further to this, I suspect that there are NO rats on Ile Longue and either of the two Bois Mangues.

If this hypothesis is correct, the future management of the six islands involved, particularly if a Marine Protected Area were to be introduced, would drastically alter. If rats were once present on these islands and have become extinct, it would be unusual and would warrant research to ascertain why. I would encourage a “recognised expert” to survey the Strict Nature Reserves of Peros Banhos for the presence of rats and publish a definitive report.

Many of the “lessons learnt” about rats are detailed in the Final Report of the Eagle Island eradication attempt of 2006 (*Chagos News* 28 Aug 2006).

Ferrying even a small number of traps and bait ashore on exposed islands, which involves swimming waterproof containers through reef-fringing surf, is testing. Crabs make the detection of rats with snap-traps on islands with very low densities difficult. Living on BIOT islands for periods of days (or even weeks) is physically demanding and logistically challenging and requires specialist training. Again, to end on a positive note, all the participants involved in the work to establish the rat presence have expressed a sense of achievement and gratitude at being granted the opportunity to overnight on an island and be part of a grander scheme to secure the environmental future of BIOT.

Coconut Removal and Native Hardwood Replanting



Clearing coconut palm to plant native hardwoods
Photo Pete Carr

On the face of it, chopping down coconut trees and replanting indigenous hardwoods appeared to be the easiest of the atoll restoration projects to achieve. However, as with most things in BIOT, it proved to be another logistical and physical challenge. Currently, I have initiated two projects centred upon coconut removal and

hardwood replanting: one on Diego Garcia and one on Moresby Island in Peros Banhos, each with differing degrees of success.

Again, to start on a positive note, the efforts by the US Environmental Department on Diego Garcia at hardwood restoration are heartening. Three areas have been identified for replanting: two in the south of the island in the vicinity of T Site and an area around the O Club in Downtown Diego Garcia. None of these sites required coconut removal and native saplings raised on the island are being used for planting. The success of these ventures remains to be seen, but their initiation is an encouraging sign and a testimony to the goodwill and efforts by the US authorities to improve the habitat on Diego Garcia.

Of the two projects being led by myself in conjunction with BF BIOT, the first is north of Minni Minni in the Barton Point Strict Nature Reserve and Important Bird Area. In a location where Red-footed Booby breeds in numbers on the coastal hardwoods, an area that had been overrun by coconut has been selected for clearing and replanting. As often as practical (depending on weather, vehicle serviceability and chainsaw availability) a small team has been cutting down coconut trees and over the months, a clearing has been created. The next phase is for me to take a team of some 25 volunteers across by boat to remove the hundreds of coconuts on the ground to prevent them reseeding the site. Together with the seed removal, we will be planting species of native hardwoods, which have been grown on island and donated by the Environmental Department.

This venture appears to be proving fruitful so far, though it could never have been achieved without knowledge of how the management system on Diego Garcia works. It has, however, been hampered by several factors, including: the fickleness of chainsaws; the ability on island to repair or replace broken

equipment; and enough suitably trained, physically fit people to undertake the work. When conducting chainsaw activities on Moresby Island (the second of my chosen project sites) these problems are hugely magnified.

Moresby Island, in northern Peros Banhos, is home to a large, dark, dank and sterile coconut plantation. Infested by rats, its only redeeming feature is that in the few remaining coastal hardwoods, Red-footed Boobies are breeding again. It is a prime candidate for atoll restoration. Not too large, it is manageable in terms of the volume of work required to restore it. It is also not too distant from the teeming bird colonies of Parasol, Longue, the two Bois Mangles and the two Coquillages and is therefore a good candidate for re-colonisation if the habitat and conditions could be improved. Large coconut crabs are still present in good numbers and there is evidence of turtle pits all round the island. It is close to a legal yachting area too, which should act as a deterrent against poachers, who may use the island as a base for their abhorrent activities. For these reasons, I selected Moresby for the concentration of outer island chainsaw work. This project has so far met with little success, due mainly to the temperamental nature and availability of chainsaws.

The hard won lessons learnt from this venture have been many and surprising. The chainsaws that the teams have been using do not travel well. Experience has shown that for the often bumpy 16 hour voyage from Diego Garcia, chainsaws have to be stowed at a certain angle to ensure they work on arrival. Waterproofing chainsaws requires a specific type of container and this is essential to ensure they are not immersed in salt water in rough weather or in transit from the mother craft to the shore. Adequate medical cover for chainsaw users in an area where a serious casualty will have to be sustained on a 16 hour voyage back to Diego Garcia (where upon they would

have to be medically evacuated off island by plane) is a serious concern.

Sustaining teams for a period of days on a rat-infested island is a challenge, as are communications if something goes wrong. All of these factors have resulted in very few coconut trees being felled to date.

Future Atoll Restoration Work

There is certainly an appetite for atoll restoration work at present, particularly on Diego Garcia. Should the proposal for a Marine Protected Area come to pass, atoll restoration will become a central theme of the terrestrial management programme.

Personal experience and reading the 2006 Eagle Island reports has led me to the conclusion that there is a logical sequence of events that would need to happen in BIOT in order to achieve successful restoration of the islands. This would be in the first stage the felling of coconut trees, followed by the replanting of hardwoods. Once an island is cleared of its “coconut chaos” and saplings are planted, the methodical setting of baited rat stations becomes easier and vastly more manageable. Shore line debris removal can run concurrently and continuously with these activities, as this is a problem that cannot be solved by BIOT alone, although regular removal will certainly improve the habitat.

However, what appears to be a logical exercise on paper, in reality is far more complicated. The physical exertion required to work in often rough seas with strong currents, coupled with inclement wet or hot weather, requires a robust, well-disciplined, experienced and trained work-force. The logistical complications involved in working in remote oceanic islands brings with it both supply and medical challenges. Finally, the unique circumstances surrounding any atoll restoration project in BIOT have to be considered.

To be successful, any future atoll restoration project in the outer islands requires knowledge of the intricate geographical and environmental conditions on the islands, for example: the prevailing weather conditions; the tides and currents; the naturally occurring dangers; and the layout and species present on the islands. More importantly, in the short term (the next ten years) the logistic problems of supplying any future projects through the militarily controlled Naval Facility requires an awareness of not only the Exchange of Notes, which governs the use of the Territory, but also the islands’ history and current political sensitivities. A knowledge of who to speak to and how on Diego Garcia (whether military or otherwise) as well as the BIOT Administration in London, is also essential to facilitate the operation.

All of this is achievable and in terms of rejuvenation and protection of these globally important atolls, is most certainly worth pursuing with vigour. This is a rare opportunity to create and leave a positive environmental legacy in an area that is not beyond repair: a marine oasis in the middle of the Indian Ocean.



Pete Carr, with the help of retired customs drugs dog Jasper, removes a haul of rubbish from Diego Garcia beaches.

Photo Martyn Dorey

Working Towards Atoll Restoration

Part two – Barton Point Hardwood Restoration Project (Clearing the Coconut Chaos)

As discussed above, one of the central themes of any BIOT atoll restoration plan must be the reversion of the monoculture of coconut *Cocos nucifera* stands back into what stood before the days of the plantations. On all islands where coconut was cultivated as a crop, the relict stands have formed dense, overgrown areas that have become virtually uninhabitable for any other flora. As a result, these anthropogenic suppressors of biodiversity have earned their description of “coconut chaos.” The living palm fronds have grown so close that they interlink and prevent any light from filtering below the canopy. The dead fronds that have dropped form a choking blanket on the ground and the seeds (coconuts) are the only rejuvenation in these monotypic woodlands where the light manages to penetrate through enough to allow growth. The coconut stands’ stranglehold on Chagos biodiversity is similar to that seen with the coniferous forestry blocks grown for logging in northern England and Scotland.

The detrimental effects of the clearing of the native hardwoods and replanting with coconut are evident everywhere throughout the Chagos Archipelago. Every island in the Egmont and the Salomons atolls has been severely impacted by coconut chaos. In Peros Banhos atoll there are only six of the eastern islands (now Strict Nature Reserves) that were not cleared of hardwoods and replanted with coconuts. The second largest island in the Territory, Eagle Island, on the western rim of the Great Chagos Bank, is totally overrun with them. Excluding Diego Garcia (due to its atypical situation with the military establishment that it hosts) an estimated 80% of all available landmass in the

Chagos has its biodiversity suppressed through the monoculture of relict coconut stands.

Sadly, one of the only species that regularly feeds and shelters in amongst the coconut chaos is the other major Chagos pest: the rat. The total loss to the overall terrestrial biodiversity in the Chagos, due to the coconut stands and the rats they host, is incalculable.

Terrestrial atoll restoration, in macro-terms, requires a vast percentage of the coconut plantations to be removed and replaced with native trees in order to increase biodiversity on the islands. By clearing the coconut chaos, the chances of any rat eradication project on an island (as discussed in the previous article) being successful are also greatly enhanced. The two scourges of Chagos terrestrial biodiversity, rats and relict coconut stands, are historically interwoven: rats are only present on islands that man has cleared of hardwoods and either lived on or visited regularly. To greatly enhance the prospect of successfully breaking this inquilinous historic manmade link, the two species need to be managed as a single consecutive project on any island: clear coconuts; eradicate rats.



“Coconut Chaos”. Monoculture stands of coconuts, left as relicts from the plantation days, cover the majority of the available landmass in the Chagos. They are dark, dank, inhospitable areas that offer very little in the way of biodiversity *Photo: Pete Carr.*

Finally, before talking specifically about the recent atoll restoration work on Diego Garcia, I fully acknowledge that

Cocos nucifera has an important role to play in the Chagos ecosystem. It is an excellent pioneer species that is particularly important in the beach stabilisation process. It is also recognised that it provides nutrition when living and nutrients when decaying. There is no thought of complete coconut eradication in the atoll restoration programme.

2009 Terrestrial Atoll Restoration Progress Report

In February 2009, during a visit by the BIOT Environmental Advisor, Prof. Charles Sheppard, the terrestrial atoll restoration concept was discussed. It was agreed that it would be possible to selectively fell a coconut stand and replant it with native hardwoods. The potential benefits of such a project were obvious: it would offer the possibility of increasing floral and faunal biodiversity through planting and (re)colonisation by natural means; it would potentially offer new breeding platforms for arboreal nesting seabirds (Lesser Noddy, frigatebirds and Red-footed Booby); and it would greatly ease the laying out of a matrix of bait stations for a concerted effort of rat eradication. As part of a pilot project to assess the problems and practicalities of achieving this goal in the outer atolls, a plot on Diego Garcia was selected as the trial area.

After deliberation as to where on Diego Garcia the trial site should be, an area north of Minni Minni, 4km short of Barton Point was selected. The trial plot offered the following:

- It is in the eastern arm of Diego Garcia, which has restricted access. This area also has the use of the two FCO plantation employees, who, on occasions, can assist with the chain-saw work.
- It is the most northerly of all the large former stands and is sited in the midst of the coastal breeding Red-footed Booby colony. This would potentially enhance the prospects of seabirds

breeding at the site when it is mature enough.

- It has natural boundaries of native flora on all sides. This enhances the prospects of colonisation by native flora and fauna.
- It is of a manageable size. An important logistical factor.
- It has an access track navigable by Land Rover. Another important logistical factor.
- It is accessible by boat. Again, important logistically.

Following site selection, initial felling of selected trees was undertaken – a process that is still ongoing at the site. The process of tree-felling has been a slow one, lasting months not weeks, due to constraints such as: the number of chain-saws on Diego Garcia; their availability to British Forces BIOT personnel; the number of chain-saw qualified personnel available; the fickle nature of chain-saw reliability; and time available to visit the site.



Tree marking for felling. Within the plot site, trees selected for felling are marked by tape. Shade trees are left standing and trees that would damage potential native hardwood colonists remain – for the time being.
Photo: Pete Carr

An initial omission from the tree-felling plan was that of “shade” trees. Shade trees are coconut trees that are deliberately left standing to act as screens from the sun for planted saplings. Whether this has been a planning error or not remains to be seen.

In areas where no shade trees remain, natural colonisation is occurring by fast-growing indigenous Indian mulberry *Morinda citrifolia*, a species that could provide natural shade to slower growing larger trees. About 60% of the site had been cleared by December 2009. The remaining 40% will incorporate the shade tree concept, though their removal in the future will require adoption of a long-term management strategy for the site. It will be of interest to monitor the two separate felling strategies (open and shaded) and their subsequent success at rejuvenation.



Natural colonisation. Areas where no shade trees were left, some indigenous trees such as *Morinda citrifolia* are returning naturally very quickly.

Photo: Pete Carr

From March through to November 2009, intermittent days were spent at the site felling trees until, eventually, a large enough area had been cleared to make it worthwhile to bring in a large team of volunteers to start removing coconuts from the ground to prevent their re-growth.

On 04 December 2009, the first "volunteer day" took place. This was an island wide event, sponsored by the Naval Support Facility (who provided a craft and crew for transport), Morale, Welfare & Recreation (who funded the craft's fuel and a T-shirt for participants) and the Public Works Department (who provided native saplings, gardening gloves and tools). For my part, I co-ordinated the entire day, including: negotiations with stake-holders on island, necessary to make the day happen; drawing up a safety plan; medical cover; a communications plan

and co-ordinating the work at the site. At 0700 hrs 43 military personnel boarded an LCM at the Marina and were ferried across to a pre-marked landing site. The day started eventfully with the LCM unable to beach and the volunteers having to wade 100m to shore.



"Volunteer Day". Some of the volunteers wading ashore in preparation of a morning's work at "Barton Point Labour Camp".

Photo: Martyn Dorey

The first "Volunteer Day" was a crucial test case for the future success of the project. The day had to be fun, demanding, visibly beneficial and run smoothly and safely. For all concerned, fortunately, every one of these criteria were met. Prior to the day itself, I had marked out two 100m squares and the volunteers' main task was to remove all fallen coconuts in these areas and transport them to two "coconut dumps".



Volunteers removing sacks of fallen coconuts out of predetermined areas to "coconut dumps".

Photo: Janet Prushansky

As ever, what appeared to be a straight forward exercise on paper, proved to be slightly more challenging on the day. For example, many of the coconuts had

taken root and removing these proved physically demanding and often also involved chopping through the new roots with a machete – this was an interesting challenge for those unused to using sharp blades. Several of the coconuts were growing underneath beds of dead palm fronds, to remove these, the palm fronds had to be cleared first. To achieve this, an area had to be cleared initially with the controlled burning of fronds in converted oil drums. Fronds were then moved from a new area and piled in the cleared area, with this process repeated across the entire marked area.

The exercise also raised the question of what should be done with the coconuts once collected, (particularly on the outer atolls where such assets as a mulching machine are not a viable option). The adopted solution was to construct corrals out of lengths of felled coconut trees. The idea being to give volunteers a visible target to reach and eventually, after decomposition, the corrals will also provide a source of compost. Once filled with coconuts, palm fronds were laid over the corrals covering the nuts to stifle their germination.



A coconut corral. This one has been filled by volunteers and has fronds laid over the top to block light and stifle nut germination.

Photo: Janet Prushansky

The final challenges of the day were insects (shockingly large arachnids and coconut rhinoceros beetle *Oryctes rhinoceros* grubs) that tested those not used to the great outdoors. The intense heat, lack of breeze, hard labour and

dehydration also affected all of the volunteers to some degree. It is of note that, as a result of the day's activity, the site has become known as the Barton Point Labour Camp!

On completion of the removal of the coconuts, some planting of native *Intsia bijuga*, donated by the Public Works Department, took place. This not only involved using picks and shovels to dig the initial holes (through old coconut tree roots) but it also entailed shifting bags of compost around the site, planting the saplings and erecting a "donkey fence" around each tree for protection.



Native *Intsia bijuga* saplings donated by the Public Works Department. Photo: Janet Prushansky

In summary, the first of the volunteer days was a resounding success. The benefits of the day were twofold. It highlighted several crucial factors that will need serious consideration (covered later) when this exercise is repeated in the outer atolls and it demonstrated the productivity achievable by a well-managed and organised work force: a necessary component in the clearance of the coconut chaos.

Moving on, early December was a landmark stage for the site. A team of archaeologists were visiting Diego Garcia for a month and included amongst them Chris Hillman, a CCT member, terrestrial ecologist and veteran of the 2006 Eagle Island rat eradication project. Dr Hillman provided some excellent advice on how to improve the site (including the use of

shade trees) and also donated some of his limited time on Diego Garcia to working on the project. His contribution at such a critical stage was invaluable.

One of the suggestions that Professor Sheppard made concerning the project, which Dr Hillman has been instrumental in making happen, has been the translocation of saplings and seeds of indigenous trees from elsewhere in Diego Garcia. *Barringtonia asiatica* (Fish Poison Tree) grows in the East Point Plantation and Minni Minni areas and in early December, we collected approximately 25 seeds and sprouting saplings from underneath a massive specimen at East Point. These have now been replanted at the test site. All the saplings and seeds planted have been labelled with their species and their date of planting and fenced off to prevent the jungle dwelling donkeys nibbling on them: they will be easily identifiable for future workers to monitor. Other indigenous plants have been identified from elsewhere on the island (by Dr Hillman) and are earmarked for translocation and the hardwood nursery managed by PWD has promised to donate further native saplings.

The latest endeavour, happily taking place in my absence whilst home for Christmas leave, has been a second Volunteer Day. A US department approached me offering that (in return for the bargain price of a BBQ) they would be willing to spend a morning over at the Labour Camp. Prior to leaving Diego Garcia on 18 December 2009, I marked out another 100 metre square and found two volunteers (who have been involved in the project for months) who were content to lead the day's activities. I have since learnt that 14 personnel went across by RIB on the day and successfully managed to clear the predetermined area of all coconuts.

Terrestrial Atoll Restoration – The Future

Looking to the (very) short term future (one year), I have now received backing

for a Volunteer Day to take place once a month for the foreseeable future. Anne Sheppard has gone some way to resolving the chain-saw shortage, courtesy of arranging with Makita UK the donation of three machines and associated protective clothing, although these have yet to arrive on island. With equipment and stores in hand, the promise of appropriate transport for large numbers of people on a monthly basis, a readily available supply of hardwoods and an abundance of willing volunteers, this project is well on its way to making a lasting difference. The initial hard work at this site will have been completed by the time my tour ends in 2010 and all that remains is the monitoring and actioning of anything revealed.

Looking to the mid term (1-10 years), this project will need ongoing monitoring. This should ideally occur annually in the first ten years. From the monitoring, any action required to improve the outcome can be assessed and planned for. More importantly, this concept is now mature enough to transfer to an outer atoll. The success of the transfer of this project from Diego Garcia to, say, a prime candidate for island restoration such as Ile Manöel or Moresby Islands in Peros Banhos, will depend largely on implementing the lessons learnt from the Barton Point experience. It would make complete logistical and common-sense to undertake a rat eradication project in conjunction with any coconut clearing project.

The following is a summary of points that have been gleaned from lessons learnt from Barton Point, which need to be considered when clearing former coconut stands in the outer atolls.

It would be useful to have some understanding of Diego Garcia logistical system and BIOTA procedures. Knowledge of atoll restoration methodology, botany and rat eradication methodology would also be required,

along with technical expertise in the safe use and maintenance of chainsaws. For safety reasons, someone trained in emergency medical procedures and in communications would be advisable.

Selection of suitable islands for restoration would depend on the island being of manageable size and it would be useful if it had a natural supply of plants for planting and natural re-colonisation. (Transporting saplings from Diego Garcia to the outer atolls has resulted in several losses and this may also introduce strains of species not native to a specific atoll). The selected islands should also have breeding seabirds present or close by.

A minimum of a team of eight would be required for an island the size of Moresby Islands and the team should be self-sufficient for periods of 7-10 days at a time. Sufficient dedicated chain-saws with waterproof containers are essential along with enough round-headed shovels and a sufficient number of picks along with enough pre-cut re-bar for the complete task. Also, enough fencing for the islands where donkeys are still present!

Postscript

The Chagos Conservation Trust would like to thank Makita UK for the donation of three chainsaws and the associated protective clothing for the operators. They are winging their way out there as this goes to press.

From the article above it can be seen how these items will greatly help the island restoration project and Makita's generosity is greatly appreciated.

Other grant funding for this work has come from CCT who gave £2000 and another £500 donated via Prof Charles Sheppard.

Chagos Research in 2010

*Professor Charles Sheppard
University of Warwick*

BIOT have agreed that another largish scientific expedition can take place to Chagos in February 2010, and a year ago OTEP provided core funding to permit it to happen. From an initial ten scientists in total, a reduction in the crew number on the BIOT Patrol Vessel *Pacific Marlin* has meant that two more berths have become available, so the total number of scientists going will total twelve. The expedition duration will permit nearly a week of work to be done on Diego Garcia, and two weeks on the ship visiting the northern islands.

As in previous expeditions, there are several main themes which will be examined, all of which have relevance to the needs of this archipelago. Several are interconnected and all of them will also help BIOT fulfil its Environmental Charter. Hopefully, the next issue of *Chagos News* will have a fairly substantial account of what happened during the trip, and its main achievements; this article briefly lays out the intentions of what we hope to accomplish.

Terrestrial elements have a much higher priority this time, and other articles in this issue explain this in much more detail. Basically the island vegetation and birds will be focused upon, and this will also pick up again on possibilities of attempting further restoration of some of these small islands with a view to further enhancing the already tremendous bird populations.

Sea level and past climate change have become enormously important the world over, and this will be examined in Chagos in two main ways. One will be by examination of what we call micro-atolls, single colonies of corals which grow very close to present or contemporary sea level. With the ages

of these being known, past sea level changes can be identified. Bearing in mind that sea level is a concept relative to the land (so if the land moves vertically then relative sea level will change whether or not there is any absolute change in global sea level) and bearing in mind also that the whole process of atoll formation involves subsidence of the underlying land, then this should provide a much better idea of what is happening in Chagos. Shoreline erosion is linked with this, and one aspect will be to map this as accurately as possible. Added to this we are going to extract small cores from some selected corals and use dated slices from the cores to determine temperatures of seawater in Chagos over the past 200 to 300 years. Sea temperature, sea level and shoreline erosion are closely linked concepts.

New reef fish work is planned which will specifically estimate biomass or quantity of reef fish. How much is there of each group is one of the missing elements in our understanding right now. We know it is a lot - present estimates already tell us that - but these measurements are most important especially in the light of future expected changes. We are also going to count and measure corals, especially new juvenile corals, on the reef itself. This will be done at sites where we have done this repeatedly before, so this aspect both continues what perhaps is the longest time series of measurements anywhere, and provides us with information on current reef condition too. It is the corals of course, and their related processes, which make the reefs and indeed the islands too, and it is the coral complexity and 3-dimensional structure which determines to a large extent the identity and biomass of fishes.

On past occasions we have deployed a dozen or more temperature recorders at various depths on the reefs. Last year we recovered and redeployed about 15 which have provided temperature data at two-hourly intervals for three years. Their results are fascinating and have thrown light on one possibility for the reason why

Chagos reefs are so resilient. We plan to recover these again, download their data, and redeploy them once more. If successful, this will bring the data record to a solid four years, which is unprecedented for reefs. We have to find them of course...!

Some aspects of water and sediment chemistry will be done once again, focusing on substances which are becoming of global concern. Interestingly here this time we will include micro-plastics, the extensively fragmented particles that arise from breakdown of the massive quantities of plastics which end up in the oceans. In some parts of the world, micro-plastics are as abundant as plankton and are the same size as plankton, which can lead to starvation of plankton feeding organisms. Whatever the situation is in Chagos itself, this is now known to be an oceanic problem from which we suspect Chagos may not be immune.

Critical to the health of life on the seabed are sea cucumbers. These are the target of poachers everywhere, and healthy populations are required for a healthy environment because they 'cleanse' the huge patches of sand. Their densities have been measured in the early 2000s and in 2006, and the atolls other than Diego Garcia were shown to have seriously depleted quantities. These ongoing measurements will show, hopefully, that these are recovering.

I have also been asked, as usual, for tissues from a wide range of marine organisms by a wide range of people who need data from the centre of the Indian Ocean. As we know, Chagos fills an otherwise enormous hole in our understanding of this ocean. By samples here we mean tiny scrapes of tissue which are then used for DNA typing. With this remarkable, but now standard, technique, much better information can be obtained than ever before, using microscopic quantities. In accordance

with the policies used in Chagos, there is no wholesale collection of anything!

I have not mentioned names and institutions involved yet. This will be described in detail in the next issue (by those concerned I hope) but they include leading scientists from the Universities of Warwick and Durham in England, James Cook University in Australia, Kiel in Germany, Royal Botanic Gardens Kew, and an ornithological expert from the Royal Naval Birdwatching Club. This will be supported by two other divers, one a doctor, the other being Pete Raines, CEO of Coral Cay Conservation who does merit mention here because an important part of his work is already done: that of organization and logistics without which none of the rest would be possible. We hope this will be as successful as have been past expeditions. The approach taken has always provided a remarkably productive output of published science knowledge needed by BIOT at a cost which is, relative to many established institutions, very low.

Expeditionary science differs sometimes from institution-based science because it has to be focused around occasional visits. Given that constraint, and given the specific needs of BIOT, we hope once again to provide some more pieces to this exceptional jigsaw.



The expedition support ship and BIOT patrol vessel the *Pacific Marlin*

Photo Anne Sheppard

The Chagos Leper Colony

Nigel Wenban-Smith

In Richard Edis' short history of Diego Garcia, *Peak of Limuria*, there appears an intriguing reference to this topic: "The French in Mauritius also seem to have begun using Diego Garcia as a leper colony, apparently in the belief that turtle meat helped to cure this condition", while in 1809 "readiness to accept lepers sent from Mauritius was a condition of [some new] concessions" What do the records have to say about the matter?

In 1786, eight years after the first French establishment was set up on Diego Garcia by the Governor of Mauritius, Vicomte de Souillac, the latter penned a description of the settlement on the island as it had been developed by Sieur Le Normand, to whom Souillac had transferred the concession in 1783. It included "negroes, a store, huts, pigs in pens, chicken coops, turtle pens, assorted tools and furniture, a ships' chandlery, and all the other gear and materials necessary to the exploitation of the various items available on the island. Independent of this establishment, there was another open area on the opposite side of the island, in which there was a leper colony. When the English expedition arrived [earlier in same year], it contained 5 negroes and one negress smitten by the disease; three of them the property of the king and the rest belonging to various individuals of the Ile de France." This colony, explained de Souillac, had been set up several years earlier by the Mauritius administration, when it realised that the consumption of "turtle, fish and coconuts provide a powerful specific against this frightful malady; experience had shown this to be the case and there were negroes brought back to Mauritius completely cured after spending 18 months on Diego Garcia." The English, for their part, had insisted that Le Normand, who was in any case

by then disappointed with the island's potential, should remove to Mauritius not only himself and his workers, but also the lepers "on the western side of the island". This proposal was resisted by Le Normand on the ground that it would bring danger to Mauritius and that the Governor was already planning to make Peros Banhos the general receptacle for all lepers. As readers of *Peak of Limuria* know, the English were also soon to give up their idea of settling the island.

We then lose sight of the lepers for some years, before twelve (6 black and 6 mulâtres) are mentioned as being on Diego Garcia in 1809¹, while the log of a French vessel, the *Corinde*, records an encounter there in 1811 with two French men, claiming to be entrepreneurs, but described firmly by their slaves as being unwillingly deported lepers. From time to time in the following years, references were made to particular difficulties arising from the behaviour of some of the very small number of free citizens afflicted by the disease, in particular a persistent troublemaker by the name of Roblet, who was finally returned to Mauritius in 1827, dying there in the same year. More detailed figures appear in a report on the condition and population of the dependencies of Mauritius made in 1826. There, it is stated that Diego Garcia "has for many years been the Depôt for Lepers and must formerly have been an eligible situation, as at one time great quantities of Turtle were taken, but latterly they have become extremely scarce." At that time there were 37 lepers on Diego Garcia and 5 on Eagle Island; no mention was made of lepers at Peros Banhos, Salomon or Six Iles.

In fact, the question of leprosy and its treatment had already begun to engage the authorities in Mauritius. In part, the stimulus had come from Diego Garcia, where both the plantation proprietors and lepers had been complaining. As a result of these representations a new Regulation was promulgated in 1824, setting out fresh rules for public display. The spokesman for the Diego Garcia

proprietors in the framing of this Regulation was M. Lapotaire, proprietor of the Pointe Marianne plantation. The main requirements were that lepers should keep to the areas reserved for them, nor allow their animals to stray; specifically they were forbidden to forage for firewood, coconuts or honey, or to cut growing timber; while encouraged to establish beehives and keep poultry, they were not to keep pigs (on the ground that pork was bad for people in their condition); and penalties were laid down for transgressions: incarceration for a first offence, with up to 15 lashes for any repetition. The plantation owners, for their part, were to allocate sufficient space for each leper to have at least 50 coconut trees; they were to provide each with 30 pounds of rice per month, against repayment for those able to make it; and, to the extent possible, each leper was to receive a pound of turtle meat each day (all turtles captured were to be regarded as the property of the plantation manager, with whom rested responsibility for distribution of its flesh and ensuring that all of the blood was reserved for lepers).



The settlement at East point 1918; a Dutch print by Lieutenant Verhuell

Mr K Dirkzwager

Other provisions dealt with the reporting responsibilities of the owners, ship captains and police, who had to see to the transfer of lepers from Mauritius. The Government reserved to itself an additional sanction: the despatch to Middle Island of persistent offenders among the leper colony. In addition, the

Governor, Sir George Lowry Cole, appointed M. Le Camus, Lapotaire's *régisseur*, to be the Government Agent (*Préposé*) on the island, with the primary duty of restoring peace between the lepers, the slaves and the proprietors.²

M. Cayeux (ainé), owner of the East Point estate, had left the island in 1818, never to return. This gentleman had however left for the successive *régisseurs* who ran his plantation his own written instructions, of which only two full paragraphs survive, one requiring that those lepers who were free men be placed in a separate area at the northern end of the island, with a proper fence marking the boundary with Cayeux's younger brother's estate, the second that the *régisseurs* ensure that the Police enforced this provision, when allocating new arrivals to the various establishments - it was clear that the small numbers of free men among the lepers had been less than amenable to the demands of the plantation managers. A footnote required the *régisseurs* to provide maize grown on the island, rather than rice, for the lepers and, when maize was not available, to limit their rice ration to 8 ounces daily, reserving most of the rice for his slaves.

Whether the team sent to examine the Dependencies in 1826 had included John Beachcroft Dixon, the assistant Registrar of Slaves in Mauritius, is not clear. However, this individual quit the colony that year and penned a 125-page tirade to the Colonial Secretary. The logic and legibility of this document leave much to be desired, but it includes a passage on the condition of the Diego Garcia lepers which appears to reflect first-hand observation: "They stepped forth like troupes of Spectres, so deeply had disease and famine entered into their very souls." Dixon goes on to say that they had no food and no turtles and, in what looks like a quotation from Dante's *Inferno*, "*in terra di cerchi, beato chi a non occhio!*". Perhaps it was this passage that caused inquiries to be set in train... The Police Commissioner was to report on the numbers and distribution of lepers in the

islands; the Chief Medical Officer was to advise on treatment, including the efficacy of turtle meat; and the Admiralty authorised the despatch of HM Sloop *Espoir* to visit Diego Garcia, the Seychelles and other named islands (none in the Chagos). In May 1829, the new Governor, Sir Charles Colville, reported³ the results and the action he had taken.

By 1827, there were 85 lepers in the Chagos, 53 on Diego Garcia, of whom 39 were slaves; in Trois Frères, 17, 13 of them slaves; in Peros Banhos, 15, all slaves. On the *Espoir's* arrival at Diego Garcia in August 1828, Captain Greville, accompanied by his surgeon, visited the three estates then operating. At Pointe Marianne, superintended by Le Camus, he found "no abuse of any kind" in respect of the slaves. At the Anse David (a separate estate to the south of Horsburgh Point), run by a Mr Florigny, but owned by Laurent Barbé, he noted the absence of any asses to operate the oil mills and the fact that only three slaves were employed for each mill (the usual number elsewhere being four). Questioning both slaves and their *régisseur*, he found that "however laborious and distressing the occupation may seem at first view, the blacks do not appear to dread it any more than other necessary labours of the establishment"; otherwise he approved of the way the plantation itself was run. Not so for Cayeux's plantation at East Point, run by his *régisseur*, Mr Rival. Here, Greville reported, "the greatest discontent prevails, many of the slaves bear dreadful marks of very severe punishment (though I believe not recent)". Greville and his surgeon had plenty more to say about this plantation and about its owner, but on matters unrelated to leprosy.

As far as the lepers were concerned, however, the situation was altogether more troubling. Captain Greville was not able to discern much difference in the treatment of the lepers under the care of any of the three managers. All three

were abominable. The lepers at Pointe Marianne were in “very uncomfortable, wretched conditions”; though receiving the amount of rice stipulated by the Government, they were only rarely given small quantities of turtle, while the trees in the areas allocated to them rarely produced even the annual average of 4 coconuts found on Diego Garcia. Those on Cayeux’s estate were confined to an area where a single nut per year was all that could be expected. “I must conclude by observing,” wrote Greville, “that the lepers appear in want of every common necessary either for the amelioration of their dreadful disease or to make life even a tolerable burthen. There are 68 [slave] lepers on the island, 61 of them without clothing, without medicines or medical aid, and without the smallest rag to cover their sores; the remaining seven are government slaves and annually receive clothes from Mauritius.” The ship’s Surgeon was even more graphic. Several of the lepers, he ‘lamented to state’, having lost part of their hands and feet, were confined to their huts which were totally unfit for their accommodation... while “those who are able to walk about are compelled to work and one of them, who was old, infirm and had lost nearly all his fingers and toes, bore marks of severe and recent punishment, which he incurred by having stolen some articles of clothing from one of his comrades; in short they all loudly complained of their treatment.” Assistant Registrar Dixon’s infernal imagery had not been at all far-fetched.

Clearly, the despatch of lepers to remote islands run by absentee concessionaires, where even the uncertain benefit of turtle meat was wanting, had been shown up as indefensible. No one could accuse a hard-bitten naval captain of uncalled-for solicitude. It was however noticed by the Surgeon’s assistant that some of the lepers’ health did improve during their time spent on Diego Garcia, notwithstanding the absence of turtle meat; it seemed that the climate at least did have some beneficial effect. What then was the view of the Chief Medical Officer? Unfortunately, this official never

got round to answering the Governor’s question before retiring. Dr Shanks, his acting successor, took the view that the risk of contagion was not sufficiently serious to warrant the victims’ exile and separation from their friends, family and medical care; better that the lepers should be accommodated together in one place, where they could be cared for and supervised in an adequate manner. Responding to this advice the Mauritius Chief Secretary wrote to the Agent General in Seychelles to propose that Ile Curieuse be used for this purpose. This proposal was accepted and a contract to transport the sufferers put out to tender.



Modern day photograph of the plantation cemetery
Photo courtesy Randy Beltz

The owner of the *Hebe*, an English brig, won the contract with a bid of £400. She sailed from Mauritius on about 7 September 1829, reaching Diego Garcia a month later. Shortly after anchoring she was driven ashore in a violent gale, and with a plank stove in, immediately filled with water. After being made watertight once more with the assistance of the Blacks on the island, she set sail on 30 October, carrying 37 lepers (three others having absconded)⁴ and picked up 3 from Eagle Island, 4 from Trois Frères and 15, plus one child, from Peros Banhos. En route, the *Hebe* passed Danger Island, where three lepers (the three absconders, perhaps) were reported to have been wrecked, but could not get close enough to pick them up. The vessel left for Mahé on 6 December, after a delay resulting from her crew’s refusal to proceed until she

had been made more seaworthy. She arrived there on 23 December. The sixty lepers were then duly transferred to Ile Curieuse, where proper preparations had been made for them to join the sufferers already installed. The Agent in Seychelles, Mr Harrison, had prepared a full list of all that would be required in terms of accommodation, clothing, utensils of every kind to enable the victims to be so far as possible self-sufficient, with regular medical supervision. Subsequent inspections showed that these initial good intentions were properly fulfilled, providing an honourable end to a tragically misconceived and appallingly executed episode in the history of the Chagos.

¹ Mauritius National Archive, TB 3/1

² Robert Scott, *Limuria* (Oxford University Press, 1961) p.128

³ Despatch 35, dated 20 May 1829, in reply to Colonial Office despatch 7, dated 25 July 1828

⁴ The discrepancy in numbers suggests that 11 had died in the preceding year, but some, including the obstreperous Roblet and perhaps other free lepers, may have been returned to Mauritius.

Membership News

AGM

Our AGM was held at Over-Seas House on 24 November 2009 with 23 members present. In a brief meeting (in order to allow for formal discussion of the Protect Chagos campaign which is reported elsewhere in this issue), the Treasurer and Chairman gave their reports, which were available and have also been emailed to all members.

Executive Committee members and officials were elected in accordance with the Constitution and are now: William Marsden (*Chairman*), Pete Carr, Chris Davies, Rachel Jones, Richard Martin (*Treasurer*), Paul Pearce-Kelly, Sam Purkis, Pete Raines, Anne Sheppard, Charles Sheppard, Jean-Luc Solandt, Michelle Taylor, John Topp, John Turner, and Simon Hughes, (*Secretary*).

Subscriptions

The Treasurer would like to ask all members who pay their subscriptions by Standing Order to check that they have increased the amount to £20 a year. Unlike with a Direct Debit, we cannot do this for you. The rise in subscriptions was introduced in 2008 but several members are still renewing at £10 a year, which results in the need for chasing action by our Membership Secretary. Please do a quick check now, if you think you may be one of the traditionalists still paying £10 (or even one of the indecisive ones who are paying £15!). Thank you very much!

Richard Martin
Treasurer

Addresses

If the address at which you receive your Chagos News is incorrect or missing an important part (e.g. postcode) please contact the membership secretary at cct.membersec@chagos-trust.org

Chagos News

We are always very pleased to receive submissions for *Chagos News* from members. Articles or photographs for consideration should be submitted to chagosnews@chagos-trust.org

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Resilience of Chagos' coral reefs

Chagos reefs suffered heavy mortality of hard and soft corals to depths of at least 30m following the severe coral bleaching event of 1998, related to anomalously high sea surface temperatures caused by the El Niño and global warming. Subsequent surveys showed that up to 100% of hard corals died at reef sites in all atolls studied, with shallow reefs particularly heavily impacted.

Fast growing corals, in particular *Acropora* the most diverse and once often the most common genus on Indo-Pacific reefs, were particularly heavily impacted by the 1998 mortality, becoming a rare genus in many areas. Populations of *A. palifera* were almost entirely eliminated from shallow reef areas in Chagos. This species was formerly the dominant shallow water coral in Chagos, commonly forming widespread dense thickets between the surface and 4m depth. The expansive monospecific structures created in shallow reef areas by this species, once the central feature of shallow reef architecture, were almost entirely lost as a result of erosion in the aftermath of the mortality, lowering the height of some shallow reef surfaces by up to 1.5m.

Research carried out eight years later, in 2006, revealed that Chagos reefs have made strong, vigorous recovery¹. They have recovered their values of benthic cover, so that, in shallow water at least, it is now similar to that of 25 years ago. There is also substantial recruitment of juvenile corals, indicating a resilient system with unusually high potential for recovery from global warming events.

The extent of this recovery, and the composition of reef benthic communities around the archipelago, varied between survey sites, depths and atolls. However this ability of Chagos reefs to 'bounce back' to rich reef communities after experiencing severe bleaching-related mortality has not been recorded in other reef environments in the Indian Ocean. It is thought that this is a direct result of the absence of the many other human impacts that affect most other reefs in the Indian Ocean.

1. Sheppard, C. R. C., Harris, A. and Sheppard, A. L. S. (2008). Archipelago-wide coral recovery patterns since 1998 in the Chagos Archipelago, central Indian Ocean. *Marine Ecology Progress Series* 362: pp109-117.

The **Chagos Conservation Trust** is a charity (Registered in the UK No. 1031561) established in 1992 whose aims are to promote conservation, scientific and historical research and to advance education concerning the archipelago. The Trust is a non political association.

If you would like more information please contact the Secretary simonhughes@hughes-mccormack.co.uk. Or visit www.chagos-trust.org