A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities

Bermuda 22nd-27th March 2003

Edited by Dr Mike Pienkowski
UK Overseas Territories Conservation Forum
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Organised by:
Bermuda Ministry of Environment, Bermuda National Trust, Bermuda Zoological Society, Bermuda Audubon Society and UK Overseas Territories Conservation Forum

A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities, Bermuda 22nd-27th March 2003 - Introduction

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Background

Bermuda hosted an international environment conference from 22nd to 27th March 2003, with a focus on UK Overseas Territories and other small islands.

The conference was organized jointly by the Bermuda National Trust, the Bermuda Zoological Society, the Bermuda Audubon Society, the Bermuda Ministry of the Environment and the UK Overseas Territories Conservation Forum. It was the third such conference following those held in London and in Gibraltar. The proceedings of the Gibraltar conference can be seen at www.ukotcf.org

The conference provided a forum for government environmental agencies and NGOs to discuss key conservation issues, to highlight success stories, exchange ideas, and to forge partnerships. It was planned that Overseas Territories, and other small island communities that share similar environmental problems, should benefit from Bermuda's experiences and history of planning and conservation initiatives. Bermuda planned to learn from the success of environmental programmes tried and tested elsewhere.

The main topics were determined after wide consultations amongst conservationists working in the Overseas Territories. The sessions were:

- Conservation issues of Bermuda and conference initiation by field visit
- Environmental Charters and strategic planning
- Managing conservation organizations
- Implementing management plans
- Climate change
- Dealing with invasive species

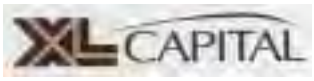
The final programme is at Appendix 1.

Acknowledgements

In closing the conference, the organisers noted how pleased they were that the whole exercise had proven as collaborative as they had hoped. This involved a partnership between the organising bodies, partnership with the supporters, and partnership between all the participants in this working conference. The UK Overseas Territories Conservation Forum itself is a partnership of many organisations and individuals, and all involved consitute an important part of that Forum in action.

The success of the conference depended on many individuals and organisations working together. Here, we acknowledge them, with apologies to those who may somehow have been omitted.

To add to the work and other contributions of the organising bodies, the organisers are grateful for financial support from:
The Government of Bermuda
The Environment Fund for Overseas Territories of the UK Foreign and Commonwealth Office



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The organising committee of the conference consisted of Annie Glasspool of the Bermuda Zoological Society, Andrew Dobson of the Bermuda Audubon Society, Amanda Outerbridge of the Bermuda National Trust, Jack Ward of the Bermuda Government, and Mike Pienkowski and Frances Marks of the UK Overseas Territories Conservation Forum.

The organising committee would like to thank two other people who also played a key part in their work. Wayne Carey of Bermuda National Trust originally, in 1999, suggested the idea of hosting such a conference in Bermuda, and persisted through considerable difficulties in sticking with the idea, helped when Annie shared carrying the baton after the Gibraltar conference. Brian Rowlinson, who was Permanent Secretary in the Bermuda Ministry of the Environment until shortly before the conference, gave invaluable support over the two years of planning.

While the Forum handled some aspects of the logistics, the smooth running of local logistical arrangements was led by Starla Williams and Vivian Blanchard of Select Sites Group. Whatever the crisis, they could find a solution, and no one noticed. In fact, so effective was the back-room nature of their efforts that, to the disappointment of many, we have not been able to find a photograph of them in action to include!

The professionals' efforts were complemented most effectively by Judie Clee and her team of volunteers from Bermuda Zoological Society and elsewhere. They manned the conference desk, greeted, sorted delegates' problems throughout the conference, advised on local facilities, and much else. In the two days of intensive final preparations by Select Sites and Forum personnel immediately before the start of the conference, a slightly worried look on the face of any organiser was immediately attended by a volunteer asking "what do you need?" or "can I help?". Bermuda maintained the fine standard set by Gibraltar in the outstanding role of local volunteers in helping the conference run smoothly and productively.

The organisers would also like to thank the staff at the Elbow Beach Hotel, the coach and taxi drivers, the boat crews and others for their efficient and helpful service. The conference is grateful too to the staff of the Aquarium and their caterers for the final reception and dinner in such a fine and appropriate location.

The conference is grateful to the Governor, H.E. Sir John Vereker, for his support to the conference, and to him and Lady Vereker for hosting a most enjoyable reception at Government House. The organisers would like also to express their appreciation to the Deputy Governor, Tim Gurney, for his help, encouragement and support throughout the planning period; they hope that he will regard the successful conference near the end of his term of office as one of the achievements during his occupancy of this post.

The conference is grateful to the Premier, the Hon. Jennifer M. Smith JP DHumL MP, finding time in her busy schedule to join the initial dinner and open the conference.

Participants greatly appreciated the close personal interest taken in the conference by the Minister of the Environment, the Hon. Dennis Lister JP MP, as well as approval of the involvement of his staff. It is not many Ministers from any administration who would sit through so many technical sessions and be prepared to speak on issues which might have controversial aspects! The Editor particularly appreciated the Minister's fine example in personally editing and providing his text for the prceedings in remarkably fast time; other contributors to this and any future conferences are invited to adopt this commendable approach!

The core of the conference depends on the work by speakers and poster-presenters, as well as their

collaborators, for their work in preparation and presentation. These provide the stimulus for the discussions and exchange of ideas leading to conservation progress. Included in these thanks are all their colleagues in the wide network of Forum member organisations, local administrations, and others, for the work on which these presentations are based. The organising team is grateful also to those who agreed to chair sessions.

Field workshops are always a worry, especially when (as in this case for various reasons) they have to be planned over a short time scale. That these were so successful is due to David Stroud stepping into the breach for overall coordination; Dr Annie Grasspool, Jack Ward and Joe Furbert for sorting much background information; the local experts who guided at each site; and the "volunteers" who acted as facilitators and rapporteurs for the various groups. Thanks are due also to the team of Dr Oliver Cheesman, Dr Karen Varnham, Dr Colin Clubbe and Dr Annie Glasspool who coordinated the workshop on Invasive Species.

Perhaps the worst job in any conference is to assemble the conclusions. The conference is fortunate that the lead in this task fell to Dace Ground, who was supported by Denise Dudgeon, Joelene Foster, Sarita Frances, Mike Pienkowski, Jack Ward (with help in the preparation, although illness prevented attendance, by Isabel Peters of St Helena). That they should have such good material on which to work is due to the enthusiastic participation of the conference delegates themselves.

Finally, a tale - or is it a tail? Acknowledgement should be given to Tim Heath of the Institute of Imagination who designed the conference logo, both the original and the slight modification used for this conference. Most people think that it is a fish but, in fairness to the designer, he has always noted that it is a design, not a picture, and what anyone sees is at least partly due to their own imagination. When one of the conference organisers first saw an early draft emerging from his fax machine (and therefore in 'portrait' rather than 'landscape') he assumed it was based on a flower. A Tristan da Cunha delegate complained at Tristan's placement in the tail of the fish - but they could equally be at the top of the flower. Like our designer, the conference avoided fixed perceptions and took a fresh view of many things. The organisers hope that these Proceedings give some reflection of that.

Editor's Preface

In producing these Proceedings, the Editor has tried to stay as closely as possible to the structure of the conference. Efforts have been made to secure texts from all speakers, and thanks are due to those who obliged for tolerating this irritation. Unless authors opted otherwise, the illustrations from their conference presentations have been used to illustrate their papers in these Proceedings. In those few cases where texts were not supplied, papers have been constructed from Powerpoint presentations where practicable; the Editor regrets that it has not always been possible to explain some abbreviations and references in these cases.

In editing the texts, insofar as was practicable in the transition from spoken to written formats, the original styles have been retained. The degree to which tenses etc have been adjusted in this context has been determined pragmatically in relation to content and clarity. As most UK Overseas Territories opt for UK English, this has been used except for proper names, but some other versions of English may have crept through under the Editor's radar.

In a few cases, speakers were unable to attend the conference at the last minute, in the rather unusual week for international travel that the conference took place. In the cases where the authors have been able to supply their contributions, these have been included.

Versions of poster papers have been included where authors opted to supply these. They have been placed in the most appropriate sections.

The selection of topics was chosen on the basis of a wide consultation conducted well before the conference, with the constraint that the total number of topics had to be restricted if useful progress were to be made. Inevitably, any classification does not fit all items. Where papers in other sessions are particularly relevant to any one session, this is noted in the session introductory note.

Authorship has been attributed as indicated by the authors themselves, rather than relating simply to whoever actually presented the materials at the conference.

We have aimed to make these Proceedings available as rapidly as possible, so that they can serve as

aide-memoires for participants as well as to respond to the flow of requests already being received from those unable to attend. This has meant some compromising in that some aspects might have benefited from an alternative approach. Undoubtedly, there will be errors, for which the Editor apologises in advance. He would be grateful if information on any substantive ones could be sent to him (pienkowski@cix.co.uk) so that periodic errata may be issued.

Given the widely dispersed nature of users (as well as economy), we decided on publication on the internet. Again, even despite using very efficient software, there are compromises between image quanlity and file size. The format used is intended for users to download before keeping on file and/or printing, rather than reading by internet on each occasion of use.

The Editor would like to thank all those who have assisted, by supplying materials, answering queries, finding or providing illustrations, etc, and particularly Frances Marks for undertaking much of the chasing, and Ann Pienkowski for additionally checking and editing.

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Conference participants

Contents

The conference at work (BP, MP)

Conference conclusions

Preamble

This conference was designed to be of help in some of the priority issues identified by workers in small territories. The conference was deliberately participatory for all, rather than segregated into speakers and audience, because exchange of experience was a key. For this reason, the organisers wanted to capture rapidly some of the main conclusions arising from discussions. Throughout the meeting, a small team kept track of these. This was led by Dace Ground, Turks & Caicos, UKOTCF, with the help of: Denise Dudgeon & Joelene Foster, FCO; Sarita Francis, Montserrat National Trust and Permanent Secretary Montserrat Chief Minister's Dept; Mike Pienkowski, UKOTCF; and Jack Ward, Bermuda Department of Conservation Services. Isabel Peters, of St Helena Government was to have been part of this team, but was unable to attend the conference due to illness; she kindly provided some comments to help some aspects. Participants were encouraged to draw the attention of members of the team throughout the conference to points they thought important to include in the conclusions.

In the final session of the conference, Dace Ground presented the first draft of the conclusions. This was then discussed and approved by the conference. The version given below incorporates additional points made in that discussion.

The contributions from the conference are gathered together here, for publication on this web site. As a first element, here are the conclusions.

Stakeholders/Public Awareness and education

In everything we are doing all over the world, stakeholder participation is an important factor. In projects as diverse as developing Bermuda's Biodiversity Strategy and Action Plan to convincing independent tour guides in the Falkland Islands that conservation will improve their livelihoods, consultation early and often means the results work for the community and the community has a sense of ownership of both the resource and the product.

This was really clear in the case of the Biodiversity Management Plan centred on the Turks and Caicos Ramsar site; the community told the experts what they wanted: the preservation of their communities and way of life as well as the environment, and that drove the development of the plan, and is the reason for its deep support in the community. Brendan Godley used his very real respect for the turtle fishermen and all they know as the means to defuse their suspicion that he was there to shut them down. The Bahamas Trust takes its guidance as much from the great depth of local knowledge as from experts and they have people asking for more protected areas, a pretty amazing feat. The same trick worked in Tristan, where the image will stay with us for a long time of Gough Island as the Trojan horse, creating pride of the local people in the declaration of World Heritage status and converting them to support for other protected areas.

It is no news to anyone here that public education and awareness are essential to every aspect of concern, from global warming to protecting penguins from clumsy humans. In the case of the penguins and their neighbours, Becky Ingham told us how Falklands Conservation are addressing the growing numbers of cruise ship visitors and the environmental concerns this is raising – by placing their office where the liners arrive at Stanley and, at sensitive sites, introducing interpretation and guidance. Our workshops identified many education opportunities in the protected areas all over Bermuda, and each of us has similar opportunities at home. It was interesting to learn that ten years on, the programme carried out by the conservation NGO RARE in Cayman has left lasting benefits in the conversion of the indifferent majority to conservation values. A similar programme is being carried out in New Caledonia, and the sense of pride created by a new NGO in a local parakeet has helped to ensure its survival and inspired the awakening of an environmental consciousness.

Environment Charters

This was the first formal review of the Charters since they were signed in September, 2001. We heard from Valerie Caton about the UK government's priorities for the Charters for the

coming year and the various funds available to the UKOTs for environmental projects. Valerie invited participation from the UKOTs in the SPAW (Specially Protected Areas for Wildlife) Protocol of the Cartagena Convention, in the Sustainable Tourism Initiative and in the workshop connected with the "White Water to Blue Water" initiative.

Since the Charters were the product of so much work by the institutions represented here, we were delighted to see from the tables developed by Denise Dudgeon that progress on implementation is being made. Each of the UKOTs is responsible for developing a strategy for action which will identify what it needs to implement the Charter. Until that is done, it will be harder for the UK Government to carry out its own Charter commitments to maximum effect.

Each UKOT will have a different approach to this: Bermuda's Biodiversity Strategy and Action Plan is an excellent example. The FCO is funding both the Turks and Caicos Islands (TCI) and the Falkland Islands to carry out two contrasting approaches which will serve as models for other UKOTs. The TCI exercise will also result in a guidance document which we hope will help other UKOTs in this process.

We also heard about a Charter implementation process in Montserrat (a member of the Organisation of Eastern Caribbean States, OECS) which is also implementing their St George Declaration on the environment, and learned that the two are entirely compatible and implementing both is a feasible task – at least it is if you're Gerard Gray, and even he is worried about funding. Anguilla and British Virgin Islands (BVI) are also members of OECS and signatories to both charters.

Whilst welcoming the increasing involvement of the Crown Dependencies in the Forum, on the official side we should also note the long-standing problem experienced by the Crown Dependencies: they link into UK Government through a different route and fall into a gap which means no Environment Charter and no external sources of funding for conservation projects.

The conference appreciated the strong commitment by the UK Foreign & Commonwealth Office to the UKOTs and the Environmental Charter process by the attendance of senior and supporting staff from both Environmental Policy Department and Overseas Territories Department – in what was clearly a challenging week for FCO. Disappointment was expressed at the lack of representation of the Department for International Development (DfID) and the Department of Environment, Food & Rural Affairs (Defra). The Managing Director of Joint Nature Conservation Committee (JNCC) indicated that, as statutory adviser to Defra, JNCC would ensure that they were briefed on the important issues of the conference, and FCO personnel indicated that they would brief UK Government (HMG) colleagues generally, and it was suggested that the Forum send the conclusions to the UK Minister leading in this area.

Funding

The UK Government has specific commitments to the UKOTs, as mentioned in the Charters, and funding is a matter of great concern. The DFID fund promised in the White Paper is only now being created, and at about 40% of the annual level originally announced, with a total over the years of about 2/3 the level promised in 1999. The UKOTs are unable to access many kinds of international funding, and amalgamation of the separate FCO Environment Fund for Overseas Territories (EFOT) into a wider global fund, although providing access to more funding, also results in the UKOTs having to compete against larger and better resourced countries. It was unnerving for the UKOTs to learn that the fund which is specifically mentioned in the UK's Charter Commitment 8 as the source of funding for Charter implementation had ceased to exist as a guaranteed resource only eighteen months after the Charters were signed. Experience has not taught us to be optimistic about this amalgamation: problems over the years with trying to access global funds were what led to the creation of the EFOT in the first place in 1999.

This first year of the amalgamated fund, however, seems to be going well: there is a strong likelihood that the UKOTs will attract more than the half-million pounds in this year's funding round than previously allocated under the EFOT. The FCO urged more feedback from the UKOTs on project success stories to help secure more funding in future, and urged the UKOTs to liaise with Staff Officers and the FCO, as well as the Forum, for advice on putting together high quality bids. (We should note that the Forum's database module on projects provides a convenient means of gathering and reporting data while the project proceeds. The

headings were based on those then in use for EFOT applications; although EFOT's headings have since changed, the module can readily accommodate the information in its varied fields.)

The UKOTs' concerns about the loss of our dedicated fund are alleviated at present by the incredibly supportive attitude towards the UKOTs now current in the FCO. We can only hope that this will carry on through the staff changes that must inevitably come, but we know that corporate memory is not very effective. The conference encouraged the Forum to write to HMG on the need for a specific fund to support the Environmental Charters.

We were also glad to learn that there will be FCO help for UKOTs accessing EU funding. Given that the EU preference is for a few large projects, much of the small-scale work we do will not rise to that level, but if the EU could be convinced to give Fred Burton the $8 million needed to take Cayman's Blue Iguana off the endangered species list, every one of us would celebrate.

We heard about other funding approaches, notably the Bahamas' enviable endowment fund, the ultimate in sustainability, and about the Netherlands Antilles' efforts to create an even larger endowment. The desire for a permanent funding source is universal, and in the Bahamas, at least, we learned that many donors are happy to donate substantial funds on the guarantee that their funds will be used only to generate income and never be spent. We know that is not true of many institutional donors, but the Bahamas Trust has encouraged all of us that an endowment is an achievable goal. Of course, we all join Catherine Leonard in wishing that these parts of UK territory could access the UK's Heritage Lottery Fund. But since that is not so likely to happen, we heard a call for a focus on fundraising at the next meeting.

Successes

Valerie Caton urged us to tell about our successes, and we certainly heard a lot of success stories, starting with our tours of Nonsuch Island, the kind of success that left every one of us awed and inspired. We heard about a cat eradication programme in Ascension which had sea-birds nesting on the main island before the programme was even completed. We heard about species revival programmes bringing the cahow, the Cayman Blue Iguana, and the Uvea parakeet back from the brink of extinction. We heard about how one park director in the BVI went on a course about the use of Information Technology databases and from that developed a comprehensive monitoring system for managing a system of 20 terrestrial and marine parks. We learned how an adaptive management approach over a period of centuries has kept Jersey's beloved ormer on tables throughout the Channel Islands (and who would have thought a spinach-eating mollusc would be a comforting pet for a Jersey student away from home!)

Success stories teach us a lot about best practice, and other people's trials and errors, i.e. the "lessons learnt" also teach us a great deal. We need to report on our failures as well as our successes, and we thank Tara George for leading the way.

Sometimes best practice is best practised in the breach: in the Bahamas when a huge amount of park area was offered, we learned that seizing the moment and getting the parks designated, even if they are going to be paper parks for a long time, can be the smart thing to do. Science and management schemes can come later. The lesson we learned was to temper the need for science with basic pragmatism: *Carpe Diem!*

Success stories also come from international cooperation. Fred Burton told us what can come out of two days with the right set of scientists when conserving Cayman's "Blue Dragon" is the job. But we also saw that in the case of the international body charged with developing appropriate management for Caribbean sea turtles, that the international body could not do the job without its local partners.

Valerie's plea for success stories underlines one of the basic principles of successful fundraising: tell your donors what you are doing with their money and they will give you more.

Economic impacts

David Suzuki told us that traditional economists would consider all of the foregoing as "externalities" but we did learn some things that they might consider relevant, like the job multiplier the UK National Trust has documented: between five and nine community jobs for every job directly created by the Trust. Over and over, from Middle Caicos to New Caledonia, we learned

that conservation creates jobs and sustains communities.

David Suzuki also reminded us of the World Conservation Union (IUCN)'s standard that 12% of land should be specially protected, and we saw some pretty amazing achievements on that score, from the Bahamas 20% to Tristan's fantastic 44%.

Institutional Issues

We learned a great deal about the different institutional arrangements people have come up with to achieve conservation goals and cope with special problems. The Bahamas and the BVI have Trusts which are closely aligned with government, in which the governments seem almost to have delegated responsibility for legislation. Another model is the Bermuda Aquarium, an unusual and highly effective combination of a government department supported by an NGO. St Helena is the newest National Trust among us, its creation aided by both the FCO and the Forum.

We were surprised and delighted to learn that Bermuda reorganised its Environment Ministry using a checklist developed by the Forum.

Over and over we heard about the importance of exchanging information and expertise. People are concerned about the same work being repeated and lessons not being shared – this came up strongly in the discussion about invasives, where the need to maintain contact and share experiences was felt to be especially important. That, of course, is one of the Forum's central roles, as well as capacity building, and with better resources for the Forum itself, more can be done in more UKOTs. One key tool for information exchange is the Forum's database which is designed as a means of helping people in the UKOTs make the most of their very limited time. The information module, for example, could be used to advise the UKOTs of the expertise available in the UK and other UKOTs and to post model legislation. Database entry needs the time to enter information but that can be done by copying-and-pasting from, for example, your newsletters. Recycle your work for future use!

There was also discussion of the use of existing capacity of the Forum's website for discussion groups or chat rooms. This needs volunteers interested in the relevant topics to act as moderators.

From the Isle of Man we learned of an approach for the perennial problem of the limited staff resources of small territories. Two particular points were the structured approach to deciding between conflicting priorities and the development of integrated biological records systems and land use information to aid planning and decision-making.

Challenges

We learned a lot about sustainable use, from the ormer fishery in Jersey and sea turtles in the Caribbean to the use of fanner grass in Middle Caicos. And we became aware of the need to consider the sustainability of conservation efforts themselves.

Like stakeholder consultation, the problem of invasive species came up in many presentations. If we had not thought of humans as an invasive species before, we certainly do now. Nick Bates told us that we are such a successful invasive species that we can consider ourselves now to be in the Anthropocene Era.

But since invasive species are such a universal problem, we spent the final afternoon listening to each other, sharing an endless variety of problems associated with this. We recognised that Invasive Alien Species (IAS) are a major threat to biodiversity – second to habitat loss and fragmentation, but still the number one threat to biodiversity on islands. This is clearly demonstrated in Bermuda where IAS are a huge problem with about 95% of the islands' flora and fauna being introduced. We debated three components of the problem: awareness raising, control of already introduced aliens and preventing future introductions. If ever there were a subject rich with both successes and failures, as well as endless management, this is it. Just the thought of a million Brazil Pepper seedlings each year on Nonsuch Island alone leaves one limp.

We also learned that nearly extinct natives can teach us about themselves, if you know how to listen. David Wingate told us how the plants themselves are teaching him about the pre-colonial Bermuda landscape, while Fred Burton in Cayman is learning about habits of iguanas in the wild by watching released captive-bred iguanas.

Climate change is another challenge, and we learned more than we wanted to know about the

impact on coral reefs. We learned that conservation of high latitude reefs such as those in Bermuda is even more important than we had thought, and that the need to prevent overfishing and pollution is heightened by the ongoing stress of global warming. The situation in British Indian Ocean Territory (BIOT) is particularly grim. And if that is not bad enough, David Wingate tells us that global warming has already had a negative impact on nesting seabirds in Bermuda, and active intervention is essential. It is difficult to see any solution without changes in the energy policies of certain major developed countries. It was suggested that a letter should go from this conference to HMG on the importance of climate change to islands.

Another major challenge which we could address more easily is illustrated by the introduction of intensive cruise liner development in the Turks and Caicos Islands. We hope that when the current strategy for action for the Environment Charter is fully in place, this will lead to more sustainable decisions.

JNCC Conclusions

Representatives of Joint Nature Conservation Committee (the UK Government's statutory advisor on nature conservation) offered some comments for the wrap-up and the committee thought them so interesting and potentially valuable that we have included them verbatim:

UKOTs provide one of the few opportunities to resolve some of today's biodiversity challenges by an ecosystem-type approach – considering the joined-up components and impacts. The learning from projects/pilots would be of significant value to more developed and complex parts of the world. The UKOTs can therefore be considered as an opportunity for investment with two major benefits:

1. to meet obligations under Multilateral Environment Agreements (MEA)s, or global conventions
2. to provide cost effective and transferable solutions to global environmental problems

However, investment will only be attracted if there is confidence and belief that real benefits/gains are likely. To ensure this, not only direct funding will be needed, but also the appropriate levels of scientific and business skills. There are likely to be special requirements for project planning and management, resource management and negotiating skills. These should not be regarded as an overhead as they are critical to the long-term success and permanent adoption of new approaches by stakeholders and particularly those with governance responsibilities. Should a proposal of this nature be made, JNCC would be willing to make some investment.

Bermuda

And finally, we got to know a bit about Bermuda, its great beauty as well as its problems. Bermuda's Minister for the Environment told us at the outset that we are all visionaries like David Suzuki. While most of us know just how low our visionary energy is most of the time, we did learn about true visionaries like Olivier Robinet in New Caledonia, and we had the great privilege of meeting Bermuda's genuine visionary, David Wingate. And we heard over and over about the importance of highly-dedicated individuals in progressing conservation all over the world.

The workshops on Bermuda taught us about the challenges of management here, and we hope some of our ideas will be of help to the Bermuda site managers. The unique opportunity to secure Cooper's Island for conservation management seemed the most pressing issue. The restoration of this island is strategically important in the context of the management of adjacent protected areas of international importance, and would not only be a huge win for biodiversity but also give Bemudians a major area for recreation and generally for enhancing the quality of island life. Generally it was felt that the protected areas in Bermuda – even those that are degraded – have significant recreational and educational potential and should be top priorities for conservation and management.

Future conferences

Do we need them? Are they useful? If we do want future meetings, then we need some good solid reasons for them, and we need a venue.

And of course you didn't need me to read this to you, as we all know that all you have to do to learn anything under the sun is to log on to Forum's website, that would be www.ukotcf.org…

The conference at work (MP), while (bottom left, FM) in the breaks some of the conclusions team engage in animated debate before Dace Ground presents the final results (bottom right, BP).

Topic 1: Opening of Conference and Conservation issues of Bermuda

This section includes the opening of the conference by the Premier and the welcoming address by the Minister of the Environment, as well as an introduction to Bermuda's environment and conservation issues by a team from the Bermuda-based organisations of the organising team. An integral part of that introduction was a visit to some key areas of Bermuda. On this page are illustrated some of the images and issues of that day, as well as a supplementary visit.

The boat trip to Nonsuch Island across Castle Harbour passed some very expensive housing, including a site where construction material had been dumped on a supposedly protected area for endemic plants (MP, BP).

Jeremy Madeiros checks cahow nestlings in artificial nestboxes on one of the few small eroding islets where intensive repair work is needed each year to help this rare bird avoid extinction. David Wingate shows the conference nest boxes on Nonsuch, where it is hoped eventually to attract the birds to recolonise (MP).

Participants were excited by the caves at Walsingham, whose value certainly warrants the standing of a Wetland of International Importance under the Ramsar Convention (MP, BP, BP, EC).

Spittal Pond provided another valuable range of ecosystems, so that David Stroud could not resist taking further notes for the formal Ramsar site description, before delegates returned to the conference hotel, enthused for the indoor conference sessions (MP).

Official Opening by the Premier of Bermuda

The Hon. Jennifer M. Smith, JP, DHumL, MP

It is with great pleasure that I welcome you to Bermuda to share in this historic conference. This is the third gathering that has been held to focus attention and share ideas on approaches to the conservation of the unique natural treasures that are supported by the Overseas Territories of the United Kingdom.

I am especially pleased to be here to celebrate the realisation of the dream of Mr Wayne Carey of the Bermuda National Trust, who proposed that Bermuda host such a meeting during the "Breath of Fresh Air" conference that was held in London in 1999. It is wonderful that this suggestion met with the enthusiastic support and encouragement of the delegates at that conference, and that the idea was so fully embraced and promoted by the leadership of the United Kingdom Overseas Territories Conservation Forum.

It is abundantly clear that you, the delegates, feel that this meeting of the minds is critically important in furthering your work. This is most dramatically evidenced by the commitment that many of you have made to travel such long distances to be here. I understand that some of you have been travelling for over a month – that is remarkable and I am truly humbled by your commitment. Although this meeting has not even begun, it is obviously a success. Here with us today are representatives from 14 of the 19 Overseas Territories and Crown Dependencies and they are joined by representatives from other small island states in the Caribbean as well as the United Kingdom, the United States, France and South Africa. Over 50 overseas participants have committed to this conference. Knowing how much you value this experience, and recognising the remarkable level of participation of the invited parties, I anticipate that you will make great strides in forwarding your collective mission.

Bermuda is proud and honoured to be able to host such an important conference, we are happy to be able to share our experiences in attempting to conserve our natural heritage and we look forward to learning from the experiences of you, our respected colleagues.

I wish to give due recognition to the many collaborating organisations that made this conference possible:

Hosting and organising this conference are -

- The United Kingdom Overseas Territories Conservation Forum,
- The Bermuda Government's Ministry of the Environment
- The Bermuda Audubon Society
- The Bermuda National Trust
- The Bermuda Zoological Society,
- with logistical support provided by Select Sites

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- The Bermuda Government
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- Fidelity Investments
- Capital G

Ladies and Gentlemen, it is again my distinct pleasure to welcome you here to the lovely Isles of Bermuda. I look forward to reviewing the final conference notes. Enjoy the conference and enjoy the hospitality of our island home. I now declare this conference **"A Sense of Direction"** officially open.

Welcome Address

Minister of the Environment, the Hon. Dennis Lister, JP, MP

Mr Chairman, Cabinet Colleagues, distinguished guests, delegates, ladies and gentlemen.

I am pleased to have the opportunity to bring a warm welcome on behalf of my colleagues in Government and the people of Bermuda, to all of our overseas visitors attending this landmark conference on the environment. We are very happy that so many of you have travelled so far to attend this meeting and I am confident that the people will extend to you the traditional Bermudian hospitality for which we are so well known.

It is a particular honour for me to welcome again, our distinguished guest, Dr David Suzuki, who brought us a brilliant but sobering message last evening as the keynote speaker for the official opening. I feel we have scored a major coup in securing Dr Suzuki for this event. Few scientists come as eminently qualified to speak to us on environmental issues. Dr Suzuki is the face of the environment movement in Canada. He is a leader in the field of conservation awareness and education. He is a visionary who, decades ago, recognised potential threats to the environment and used the mass media to alert the world.

I am sure that you have been inspired by what he had to say. Today, however, I would like to remind the delegates gathered here that all of you are visionaries in your own right. By your presence at the conference, you are demonstrating your commitment to preserving the environment through your work in your own countries. Many of you have made a long trek to be here. This tells me that you recognise the importance of meeting with like-minded individuals to further your collective mission. I encourage you to take inspiration from the reservoir of knowledge and experience that Dr Suzuki has passed on to you. In time, you too will make your mark in your endeavours to promote issues concerning the environment.

Yesterday, you had an opportunity to tour Bermuda. We prayed for sunshine so that you could see us at our Bermudaful best! From all accounts, this was an enjoyable and enlightening tour. As you travelled, you would have witnessed Bermuda's pristine beauty, its limited land, its traffic and some open space. You could see evidence of careful residential planning and recent commercial development. You also had an opportunity to visit areas of conservation research that are carefully managed.

Bermuda has a history of conservation dating back to the 1600s and our present environmental awareness is a result of this history. We have benefited from visionaries who saw the need to act swiftly, let me share some examples. The Premier last night mentioned: the Turtle Legislation of 1620 (this is the oldest known environment legislation in the western world); the motorcar act that restricts the ownership of cars to one per household; the anti franchise act that prohibits the establishment of overseas restaurants in Bermuda. Now in the 21st century, we face the enduring challenge of balancing the need to preserve our natural treasures with the need to develop for economic growth. I am sure that this week will bring new insights for us in this regard.

During the week, there will be many conservation issues that we have that are common to all small island territories. This conference will provide a forum for sharing such issues. There are likely to be a divergence of views that generate lively debate among you. This conference will allow you the freedom to express your views. Among you there is a genuine desire to address the uncertain future of our shared natural environment. This conference will give you the opportunity to propose realistic solutions together.

The Ministry of the Environment is grateful for the productive working partnership we share with so many non-government agencies that support Bermuda's environmental concerns. This conference will also give us the opportunity to demonstrate how this partnership has played a key role throughout our history of careful attention to conservation initiatives.

I hope that during your stay, you will have the opportunity to enjoy this beautiful location, the Elbow Beach Hotel with all its amenities, including one of the best beaches in Bermuda. We want you to feel at home, to get to know the people of Bermuda and your fellow delegates. After all, we are all partners in the common cause of protecting and preserving the good health and well being of the earth.

The Ministry of the Environment is proud to host this conference. It is one of the most ambitious projects we have undertaken to discuss issues of the environment. I am looking forward its success, and I trust that you will gain valuable insight from being here. Work hard, but enjoy yourselves.

In closing allow me to thank those persons who have worked tirelessly on behalf of the Ministry to make this conference a success: Mr Jack Ward, the Director of the Department for Conservation Services; Ms Amanda Outerbridge, from the Bermuda National Trust; Dr Annie Glasspool, representing the Bermuda Zoological Society; Mr Andrew Dobson, representing the Audubon Society; and Mrs Starla Williams

Thank you.

Dr David Suzuki (left), who gave the opening address at the opening dinner, here with Andrew Dobson, who introduced the speaker

Amanda Outerbridge, Andrew Dobson, Jack Ward (who appears elsewhere in these Proceedings not hidden by water-bottles and microphones!) and Wayne Carey start the conference presentations

Introduction to Bermuda's environment and conservation issues

Amanda Outerbridge, Executive Director, Bermuda National Trust; Andrew Dobson, Vice-President, Bermuda Audubon Society; Wayne Carey, Vice-President, BNT; and Jack Ward, Director, Dept of Conservation Services

Outerbridge, A., Dobson, A., Carey, W. & Ward, J. 2003. Introduction to Bermuda's environment and conservation issues. pp 19-31 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

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Good morning and welcome to Bermuda and *A Sense of Direction*, our conference on conservation in UK Overseas Territories and other small island communities. I am Amanda Outerbridge, Executive Director of the Bermuda National Trust, and a member of the conference organizing team. On behalf of this team, I would like to say how very pleased we are that you were able to attend. Some of you have travelled far to be here – and in these uncertain times, that takes courage and patience. We are very pleased to see you.

As you will have noted from your conference programme, you have a busy four days ahead of you. Today is our opportunity to introduce you to Bermuda, a scenically beautiful island with diverse flora and fauna,





a unique built heritage




– and a number of conservation issues resulting from the density of development.




Our aim this morning is to give you an informative overview of our island, warts and all. The list of delegates in your conference package will give you some idea of the many agencies and organizations, governmental and non-governmental, working in the field of conservation in Bermuda. And we are getting better and better at collaborating to address our most challenging issues, to which this conference is testimony. Of course, we still have much work to do.

Our speakers this morning, appropriately enough then, represent public and private sectors.

First, Andrew Dobson will talk about Bermuda's terrestrial features. Andrew is a member of the conference organizing committee, a passionate bird watcher, teacher and vice-president of the Bermuda Audubon Society. He has written a book on birds of Bermuda and will be happy to sell one to you at a special conference rate!

Jack Ward is the hard working Director of the Government's newly formed Department of Conservation Services. He is a marine biologist, has worked at the Bermuda Biological Station for Research, and was most recently Head Curator at the Bermuda Aquarium, Museum and Zoo. He will talk about the Islands' marine features.

Wayne Carey is Vice-President of the Bermuda National Trust, which has worked for more than 30 years in conservation, through its stewardship of natural and built heritage, as advocate for the environment, and as educator. Wayne is also Director, Energy Supply at the Bermuda's electrical utility company. This morning he will review the environmental impact of man on Bermuda.

I will now hand you over to our speakers, beginning with Andrew Dobson.

Bermuda's Terrestrial Environment, by Andrew Dobson

Bermuda is located at 32° North, the same latitude as Savannah (Georgia), Dallas (Texas) and San Diego (California) in North America and Baghdad (Iraq) in the Middle East. At 64° West, Bermuda has the same longitude as Halifax, Nova Scotia to the north, and Puerto Rico and the Virgin Islands to the south. The closest landfall to Bermuda is Cape Hatteras, North Carolina, some 570 miles (917 km) to the west. Many people think that Bermuda is part of the West Indies, but the Caribbean Sea is about 1000 miles (1600 km) to the south.

The name 'Bermuda' comes from the Spanish explorer Juan de Bermudez, who is credited with discovering the islands in about 1505. 'Las Bermudas' appeared on a chart of 1511, but although some mariners may have set foot on land during the next 100 years, most feared the islands and its reefs. In 1609, the British ship *Sea Venture* ran aground on the reefs. All 150 on board got ashore and remained on the island for some 10 months before continuing their journey to Virginia. Only three people stayed and were joined by settlers who arrived in 1612 to form a permanent settlement, claiming the islands for Britain. Bermuda has the distinction of being the second most isolated inhabited island in the world. The resident population of Bermuda is now well over 62,000. The suburban nature of Bermuda is hardly surprising, as it is one of the most densely populated countries

in the world, with over 3,000 people per sq. mile (over 1,000 people per sq. km). About 14.0% of the island is covered in concrete. Bermuda's economy is centred on International Business and Tourism. About 500,000 tourists visit Bermuda annually.

Bermuda's climate is considered sub-tropical, thanks to the moderating influence of the Gulf

Stream, which helps to produce mild winters and less hot summers than would be the case at similar latitudes in North America. The Gulf Stream actually flows north much nearer the East Coast of the United States but numerous eddies branch off and reach Bermuda.

A volcanic eruption on the Mid-Atlantic Ridge formed Bermuda about 110 million years ago. Further volcanic activity took place as the seamount moved westwards, passing over a volcanic 'hot spot' about 35 million years ago. Today, Bermuda sits on the edge of the largest of three volcanic seamounts. Challenger Bank and Argus Bank are submerged seamounts that lie 12 and 20 miles to the southwest. The Bermuda seamount has experienced several rises and falls in sea level, caused by alternating ice ages and interglacial periods during the Pleistocene era. During low sea stands, exposed coral died and was eroded into sand, which built up into dunes that eventually cemented into hard limestone rock (up to 300 ft [about 100m] thick). As Bermuda's exposed rock is porous limestone, there are no streams or rivers but

there are some marshes and brackish ponds. The soil is strongly alkaline and very shallow, varying from a few inches to two or three feet [1 m] in the inland valleys. The landscape is undulating with elevations only rising to a maximum of 260 ft (79 m). Approximately 150 islands comprise Bermuda for a total land area of about 21 sq. miles (55 sq. km). The seven largest islands are joined together by causeways or bridges. The fishhook-shaped group of islands is about 20 miles long, averaging about one mile wide.

Prior to man's permanent arrival in the 17th century, Bermuda's vegetation was dominated by the endemic Bermuda Cedar, Palmetto and Olivewood Bark. The endemic Bermudiana is abundant – Bermuda's national flower. Few examples of the pre-colonial landscape remain: Paget Marsh

– a nature reserve owned jointly by the BAS and BNT provides a glimpse of the past, but even here, the centuries old cedars are dying due to saltwater inundation, the probable effects of global warming. In the 1940s and 50s most of Bermuda's cedars died as the result of a scale insect accidentally brought into Bermuda. Many skeletal cedars still

remain. Nonsuch Island, which you will visit later today, has been restored to illustrate the flora of pre-Colonial Bermuda.

However, today, about 95 percent of Bermuda's flora has been introduced, much of it now naturalised. Many of the plants, such as Ficus are invasive and a threat to native flora. Others, such as the naturalized casuarinas, do enormous damage to the limestone coastline as they are easily uprooted in storms, eroding the rocks in the process.

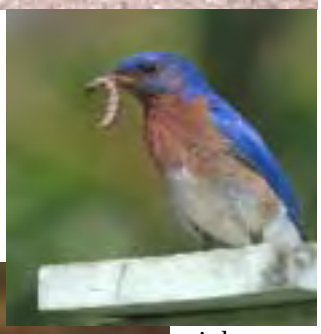
Invasive species are not confined to plants. There are a number of feral animal populations causing considerable problems. An estimated 10,000 feral cats are not only tolerated but actively fed by the

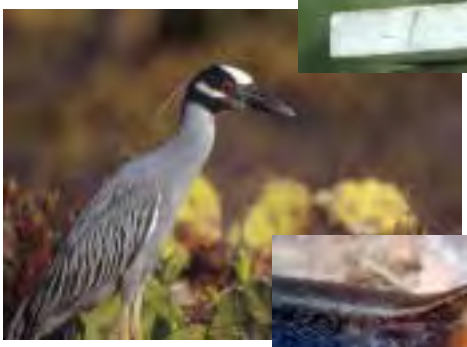
Feline Association. Feral chickens are also numbered in their thousands. Feral pigeons are a growing menace. Red-eared Terrapins, absent about 15 years ago, are now found in every pond in Bermuda. The effect of these species on Bermuda's biodiversity must be enormous.

The variety of native fauna is quite limited, something that is not unexpected for an isolated oceanic island. Although some 365 birds species have been recorded in Bermuda, only 20 species are permanent residents with a further three species visiting to breed. Bermuda is best known for its Cahow

(Bermuda Petrel), a species thought to be extinct for 300 years until its rediscovery in 1951. The national bird is the Longtail (White-tailed

Tropicbird) – which you should see today around Nonsuch Island and in the mornings along the coast outside the hotel. Native bluebirds, introduced

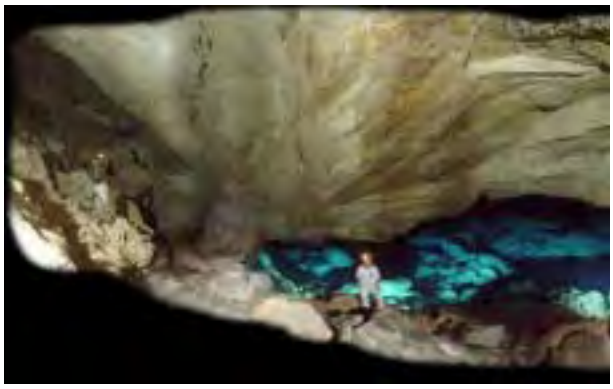




night-herons and kiskadees are likely

to be seen around the hotel grounds. There are few native land animals – but you have every chance of seeing a humpbacked whale this week as they move along South Shore outside the reef line during their spring migration. You may well encounter the two species of naturalised amphibians – the fist-sized giant toad and the whistling frog – which will be heard at night. The endemic Skink is Bermuda's

only native reptile which you may be fortunate enough to see on Nonsuch, but you will see one or more of the three introduced species of Anolis lizards. The major threats to all these species of fauna are loss of habitat and invasive species.



Bermuda has a magnificent limestone cave system – the 150 known caves makes it one of the highest concentrations of caves in the world. Once again, in a small island community, the threats are very real. Over the centuries, caves have been used as garbage dumps or destroyed by quarrying and urban development. Remaining caves hold a high proportion of Bermuda's endemic species – but

they are still at the risk of pollution and collapse from the proximity of quarrying and construction activity.

Bermuda's natural coastline, picture postcard perfect in many parts of the island, is under threat

from development: an affluent society that demands docks and marinas for water craft; sea walls that protect coastal properties. The greatest threat to beaches comes from the erosion caused by tropical storms and storm surge – this is the same house during and after Hurricane Gert in 1999.

Rural Bermuda is now characterised by small-scale market gardening in isolated fields. Locally produced crops include potatoes, carrots onions, tomatoes and strawberries. These fields are being increasingly eaten into by further urban development.

A large area of Bermuda is covered by golf courses - satisfying the demands of tourists and residents alike. They do pose a potential threat to the water lenses that are found below Bermuda's surface – the threat of pollution by fertilisers and pesticides used on the courses.

Bermuda also has a number of marshes, mainly in the central parishes. These vital eco-systems were where Bermudians traditionally disposed of their

garbage. Many of these areas are now protected nature reserves, but the marshes are still under threat from illegal dumping and industrial development. Waste disposal is a problem for Bermuda as it is in most islands of the world. Until the opening of the incinerator in the 1990s the Pembroke Dump landfill not only filled half of Pembroke Marsh, but

had created a sizable hill. Today, there are still problems of disposing of glass, paper, metals and hazardous waste.

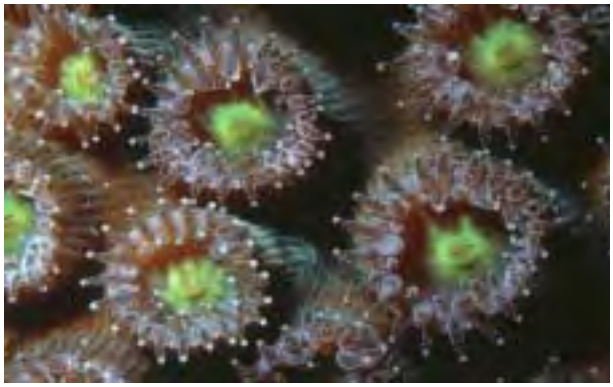
On a positive note, new reserves are still being acquired – this one, just to the west of Coral Beach, was opened last month.

Bermuda's Marine Environment, by Jack Ward

The flattened top of an extinct volcano, the Bermuda Platform supports approximately 1,000 square kilometres of fringe reefs and shallow water habitat. A ring of protective reefs follows closely to the south shore of the Island and extends offshore approximately 15 km to the north, enclosing a shallow sandy lagoon.

The Gulf Stream which passes to the West and North of the Island moderates the Bermuda's weather and brings warm tropical waters to the area thereby allowing Bermuda to support the northernmost coral reef system in the world.

Bermuda supports a depauperate Caribbean coral reef species assemblage with only approximately 50% of the coral and fish species of the Caribbean having successfully colonised this northern outpost (picture: coral cave with snappers).



An oasis of life in the oceanic desert known as the Sargasso Sea, Bermuda's reef system is dependent upon the efficient capture and recycling of scarce nutrients (picture above: coral polyp).

Whilst the fringing reefs are dominated by sturdy dome-forming corals, the protected inshore reefs support many more of the more delicate branching growth forms, such as this fire coral (above).

Very hard reefs formed from the shell of vermetid snails cemented together with calcareous algae break the surface marking the outer perimeter of the rim reefs. With the surge crashing over these reefs they are said to "boil", hence their name.

The south shore of the Island is occasionally exposed to extremely high energy, hurricane conditions (top of next column).

The northern coastline (here, in next column, at low water) is far more protected. The tidal range is

limited to approximately 1m creating a very small intertidal zone.

In keeping with Bermuda's limited intertidal zone, the species assemblage supported by this habitat is similarly limited. One notable creature is the West

Indian Top Shell which was successfully re-introduced to Bermuda in the 1980s.

Bermuda supports the northernmost mangrove stands in the world. However these stands are quite limited and threatened by sea level rise and in-

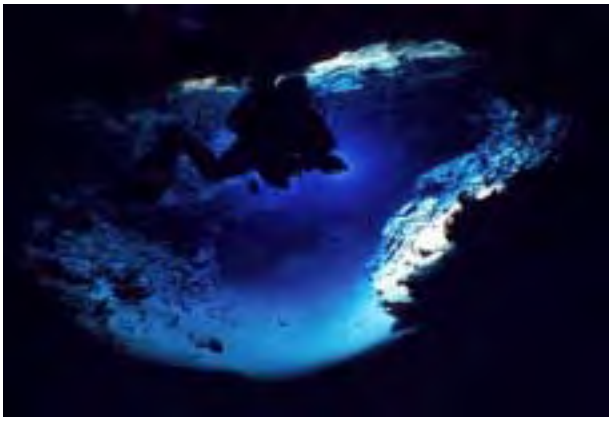
creased hurricane activity. (The previous picture is Hungry Bay, one of the study sites used for the management planning exercises during the conference.)

Bermuda's sandy beaches (e.g. above at Nonsuch) once supported large colonies of nesting sea turtles. These were lost to over-harvesting.

Formed as a depression between dunes, Harrington Sound once supported a large fresh-water marsh before being inundated with sea water approximately 6,000 years ago.

A unique habitat rings Harrington Sound in the form of a sub-tidal notch, which cuts back into the rock several metres. Created by the boring action of sponges and bivalves, this notch supports one of the most diverse sponge communities in the west-central Atlantic.

Whilst there is only one surface connection between Harrington Sound and the surrounding ocean, numerous caves (this being Green Bay



cave) form submarine connections and support a unique fauna including many of Bermuda's endemic species.

Hundreds of thousands of years ago, when the sea level was much lower, huge dissolution caves formed in the area of Harrington Sound, particularly in the Walsingham formation. Spectacular calcareous formations decorate these caves, such as this Crystal Cave (above).

A large sink hole in the Walsingham area, Walsingham Pond forms a protected marine habitat where endemic species including the killifish and a rooted *Sargassum* can be found.

One of the Island's largest nature reserves, Walsingham, borders Castle Harbour the site of the massive land reclamation project that created the airport. Corals in this area were decimated during this project and heavy siltation continues to limit recovery. This aerial picture (top of next page)

shows the causeway and dredging scars.

Used somewhat as a flagship species for marine conservation, Green Turtles are common and fully protected locally.

Despite protective

legislation there are regular negative interactions between the numerous humans living on Bermuda and our protected species. An example is this young turtle that was hit by a fast moving boat. "Split Pea" Green Turtle with split carapace is in rehabilitation at the Bermuda Aquarium, Museum and Zoo.

Once the mainstay of the local fishery, the larger grouper species have declined in abundance and many species such as this Nassau Grouper (above) are now economically extinct.

With the decline of the large groupers, fishermen shifted effort to other species such as the coney (a small grouper species).

Once relatively rare locally, the Bermuda Chub has become much more abundant in recent years, possibly as a direct result of the declining abundance of the larger predatory grouper species.

This cruise ship photographed from the air shows the huge plumes of silt stirred up as it is taken away from the dock. Ship traffic in Bermuda's harbours cause regular impacts through re-suspension of bottom sediments. The industrialisation of Bermuda's harbours has caused significant declines

in environmental quality.

The tanker Tifoso aground on Bermuda's northern reef. Marine traffic poses an ongoing threat to Bermuda's marine resources. After a spate of ship groundings in the 1980s, the International Maritime Organisation established a 30-mile radius around Bermuda as an "area to be avoided" by ships not bound for Bermuda and Bermuda erected large beacons with active radar transponders to alert mariners to the threat of shipwreck.

To end, a picture of a school of jacks in a tank at the Bermuda Aquarium, the site of the conference banquet.

Man and Environment Interface in Bermuda, by Wayne Carey

This portion of our introduction to Bermuda's environment focuses on the interface between man and environment. Official Bermuda Government documents often feature a crest with the words "Quo fata ferunt" underneath. This caption is latin for "Whither the fates lead us?", and aptly reflects the spirit and context of this conference, i.e. a need for a sense of direction.

How has Bermuda attempted to confront issues related to biodiversity conservation? There are four basic approaches:

- legislation;
- institutional action;
- community action,
- individual effort.

This brief paper will outline certain aspects of the legislative and institutional framework in support of biodiversity conservation in Bermuda.

Early Environmental Legislation in Bermuda

1620	→	An act against the killing of over young tortoises (turtles)
1630s	→	An act against the waste of cedar
1659	→	An act against the exportation of cedar
1791	→	An act against the use of fish pots (traps)

Here are examples of some of the early environmental legislation in Bermuda. In 1620 an Act was passed by the Bermuda Assembly " against the killing of over young tortoises (turtles)." This is thought to be one of the earliest pieces of conservation legislation in the New World. Other Acts addressed conservation pertaining to the waste and exportation of cedar. Notably, in 1791 an Act was passed against the use of fish pots (traps). These examples serve to highlight the early recognition of a requirement to conserve natural resources.

Legislation for Protected Species and Areas

1930	→	The Agriculture Act
1966	→	The Coral Reef Preserves Act
1972	→	The Fisheries Act
1975	→	The Protection of Birds Act
1976	→	The Endangered Animals and Plants Act
1986	→	The Bermuda National Parks Act
1990	→	The Fish Pot Ban (again)

The environmental legislative record reflects a shift from legislation targeting single species to legislation addressing broader aspects of conservation

such as the Coral Reef Preserves Act and the National Parks Act. It is also evident that legislation has addressed not only exploitation of natural resources (Fisheries Act) but biodiversity as well (Protection of Birds Act and the Endangered Animals and Plants Act). History repeated itself in 1990 when a fish pot ban was again introduced to stem the overexploitation of fish.

One of the important features of environmental legislation in Bermuda is the use of private acts to foster conservation of privately held land "in trust" for use by future Bermudians. The primary examples of this form of legislative instrument are the Walsingham Trust Act, the Bermuda Audubon Society Act, the Heydon Trust Act, and the Bermuda National Trust Act.

A testament to the value and success of this conservation mechanism is the fact that apart from the Bermuda Government, the Bermuda National Trust is the largest owner of land and open spaces on the island. Between them, the Bermuda Government, the Bermuda National Trust and the Bermuda Audubon Society are the principal nature reserve owners on the island. This is a good example of collaboration between Government and environnmental NGOs.

Not surprisingly, the regulation of development has received considerable attention in Bermuda. As early as 1947 an Act was passed that limited the number of private cars to one per dwelling unit. However, as pioneering as that piece of legislation was, it has all but succumbed to the pace of development in modern Bermuda, where the number of private cars has more than doubled in the last 30 years. The main statutory instrument to control development is the Development and Planning Act 1974. This legislation is supported by the Bermuda Plan, a key document which contains specific zoning regulations that provide direction to land development and the protection of natural amenities. Despite the existence of this legislation, it has been estimated that Bermuda has lost open space at an average rate of about 90 acres per year over the last 30 years. This highlights the strong development incentive that exists and the obvious threat to biodiversity.

Here we see a slide showing bumper-to-bumper vehicular traffic in the City of Hamilton. This congestion persists for significant portions of the day, and contributes to airborne pollution as well.

Bermuda, like other countries, has also enacted pollution control legislation that promotes the protection of habitat quality. Examples are the Prevention of Oil Pollution Act 1971, the Water Resources Act 1975, the Waste and Litter Control Act 1987 and the Clean Air Act 1991. The policy directives on hazardous waste have been somewhat successful in controlling waste, but there is a need for stronger legislation to embrace the polluter pays principle so that a higher level of protection is afforded to habitat conservation. Perhaps the recent restructuring of the Ministry of the Environment that has resulted in the creation of separate Departments of Conservation Services and Environmental Protection heralds a new focus on strengthening environmental policy and legislation.

The protection and conservation of biodiversity is increasingly coming under the auspices of interna-

tional treaties and conventions. Some of the more important international agreements that are relevant to the Bermuda situation are:

1966 International Convention for the Conservation of Atlantic Tunas (ICCAT)
1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
1971 Ramsar Convention on Protection of Wetlands
1973-8 Convention on the Prevention of Marine Pollution from Ships (MARPOL)
1982 Convention on the Law of the Sea (UNCLOS)
1987 Montreal Protocol on Substances that Deplete the Ozone Layer
1992 United Nations Framework Convention on Climate Change
1992 Convention on Biological Diversity
1997 Kyoto Protocol on Greenhouse Gases
2001 Environmental Charter (UK Overseas Territories)

Some of these require local enabling legislation and/or policy measures in order to have full force and effect.

There exists a plethora of environmental non-governmental organizations in Bermuda. The more prominent of these are listed here:

- Bermuda Audubon Society
- Bermuda Biological Station for Research
- Bermuda Botanical Society
- Bermuda Zoological Society
- Bermuda National Trust
- Keep Bermuda Beautiful
- Save Open Spaces
- Friends of Fish
- Bermuda Underwater Exploration Institute
- Bermuda Eden Project

It cannot be emphasized enough the important role that such institutions play in biodiversity conservation. What is probably required, though, is a greater level of cooperation and partnership between organizations.

As we look ahead, what are the principal threats to biodiversity in Bermuda? Here we have much in common with other small island communities. An increasing state of overdevelopment lies at the heart of threats to biodiversity conservation. At nearly 3,000 residents per square mile, Bermuda has one of the highest levels of population density in the world. Other threats are inextricably linked to overdevelopment: e.g. waste proliferation; recreational and commercial overfishing; pesticide bioaccumulation, and commercial shipping. One of the key threats to biodiversity in Bermuda is climate change. It is also clear that lack of awareness of the need for biodiversity conservation is still a threat.

Is the present legislative infrastructure sufficient to address future threats to biodiversity? There is a strong sense that the aspect of legislative infrastructure that needs most attention is enforcement. However, there are several areas where new and strengthened legislation is required. Some of these include:

- seagrass protection;
- pesticide use;
- bottle bill;
- environmental impact assessments;
- waste dumping, and
- recreational fishing.

It is difficult to escape the conclusion that Bermuda is on an unsustainable path, heading towards what some call an “island city”. Its future requires a bold vision, a new paradigm. Perhaps this conference will help to create **A SENSE OF DIRECTION**. It is perhaps even more crucial now to ask the question: *Quo fata ferunt*?

Thank You.

The Bermuda Audubon Society (poster display)

Andrew Dobson

Dobson, A. 2003. The Bermuda Audubon Society. p 32 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Andrew Dobson, Bermuda Audubon Society, Warwick Academy, 117 Middle Road, Warwick PG01, Bermuda. adobson@warwickacad.bm

Founded in 1954, the Bermuda Audubon Society exists to protect the natural environment of Bermuda. It has a particular focus on the protection of birds and on the restoration of wetland habitat. The society has thirteen nature reserves – including ponds, marshes, small islands and upland coast.

The display at the conference featured two major projects run by the society:

1. Bluebird Nest Boxes. Due to the loss of natural nesting habitat, the native Eastern Bluebird *Sialia sialis* is now totally dependent on the provision of nest boxes for breeding success. The society has championed this campaign for many years and is always experimenting with new styles of boxes in an effort to keep House Sparrows out.

2. Longtail Igloos. The cliff-nesting habitat of the White-tailed Tropicbird (Longtail) *Phaethon lepturus* has been severely reduced by building development and storm damage. Feral pigeons are also a problem in nest sites. The artificial nest-site 'igloo', a styrofoam dome, was introduced quite recently in an attempt to provide additional Longtail nest sites. The igloos have already met with considerable success.

For further information on either of these projects and information on the Bermuda Audubon Society - please visit www.audubon.bm

Topic 2: Environment Charters and strategic planning

The central purpose of this session was to review progress in different UKOTs in implementing the Environment Charters and getting biodiversity into other sectoral plans – including obstacles so that we can discuss overcoming these.

The Environment Charters will be central to integrated and effective progress of conservation work in those UKOTs which have signed Charters. The first commitment of each UKOT in the Charters is to develop a strategy for action to implement the Environment Charter. With support from FCO, and at the invitation of Turks & Caicos Islands Government, the Forum is currently facilitating a pilot project to develop such a strategy for action in TCI, with the additional aim of providing guidelines for use in other UKOTs. A progress report on this is given.

This study makes clear that much relevant work is already in progress in most UKOTs. The first paper gives probably the best example of that, with a description of Bermuda's outstanding Biodiversity Strategy and Action Plan. This will fulfil a major proportion of Bermuda's commitment under the Charter.

The Environment Charter process should benefit from other similar approaches which fulfil many of its purposes. Three UKOTs are members of the Organisation of Eastern Caribbean States (OECS), which has an environment charter process in the St Georges Declaration. The experience of Montserrat in using work on this to fulfil the needs of both processes is outlined.

The Crown Dependencies of UK have a slightly different relationship to UK to those of the UKOTs, and they do not have environment charters (although this conference seems to have confirmed the idea of some of their key personnel that they should). Very relevant experience is described from the Isle of Man in developing a strategic approach to conservation, following the appointment of a Wildlife and Conservation Officer. This has important ideas on setting priorities and biological recording amongst others.

It is important not to miss the chance of gathering ideas, approaches and experience from elsewhere. The presentation from the Bahamas provides an excellent example of close working between Government and NGO in a strategic way. For example, the use of the Bahamas National Trust to manage and provide safe ownership for the country of National Parks declared by Bahamas Government is striking.

Developing strategies is only a start. We had hoped to include a presentation from TCI Government's new Sustainable Development Planning Initiative, a community-based exercise in applying the sort of ideas discussed here to physical planning. Unfortunately, travel problems prevented this - but this is an important exercise to watch.

UK Government is committed under the Environment Charters to help the UKOTs implement these, including provision, under Commitment 8, of funding from the Environment Fund for Overseas Territories and help with other funding. The conference welcomed a strong team from FCO to address this and respond helpfully to prolonged and deep questioning.

Chaired by: Dr Mike Pienkowski, Chairman, UKOTCF;
and Avon Carty, President, Anguilla National Trust

A Biodiversity Strategy and Action Plan for Bermuda – a Recipe for Success

A.F. Glasspool, J.A. Ward, H. De Silva, W. Sterrer & J. Furbert, Bermuda Biodiversity Project

Glasspool, A.F., Ward, J.A., De Silva, H., Sterrer, W. & Furbert, J. 2003. A Biodiversity Strategy and Action Plan for Bermuda – a Recipe for Success. pp 34-38 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Although chefs rarely disclose the recipes for their signature dishes, here is revealed the way that Bermuda produced their Biodiversity Strategy and Action Plan.

Dr Anne F. Glasspool, Bermuda Biodiversity Project Leader, Bermuda Zoological Society, P.O. Box FL 145, Flatts FL BX, Bermuda. bamzcure@ibl.bm

Ingredients

Simply take….

- 1 small island
- 1 ounce of political will
- 7 locals to form a Management Team and coordinate activities (preferably fresh)
- 12 well-seasoned members of the community to form a Steering Committee for guidance and to ensure objectivity
- ½ a cup of $$$ for greasing the pan
- Several heaped tablespoons of local knowledge
- A bunch of enthusiasm
- 1 girt shot of Black Seal rum for fortification

(Note: Try to source local ingredients, as this enhances the flavour)

Additionally….

Ensure a reputable kitchen to work from (Bermuda Zoological Society and Bermuda Aquarium, Museum and Zoo).

Adopt an extensive array of utensils for blending ingredients (workshops, local media, private sector, one-on-one meetings, churches, schools, printed materials, internet).

Select experienced international chefs to inspire and guide the local cooks (Drs Abigail Entwistle and Nigel Coulson from Flora and Fauna International).

"….As with any recipe, the hungrier the audience, the better the meal tastes"

Photo by Jennifer Gray

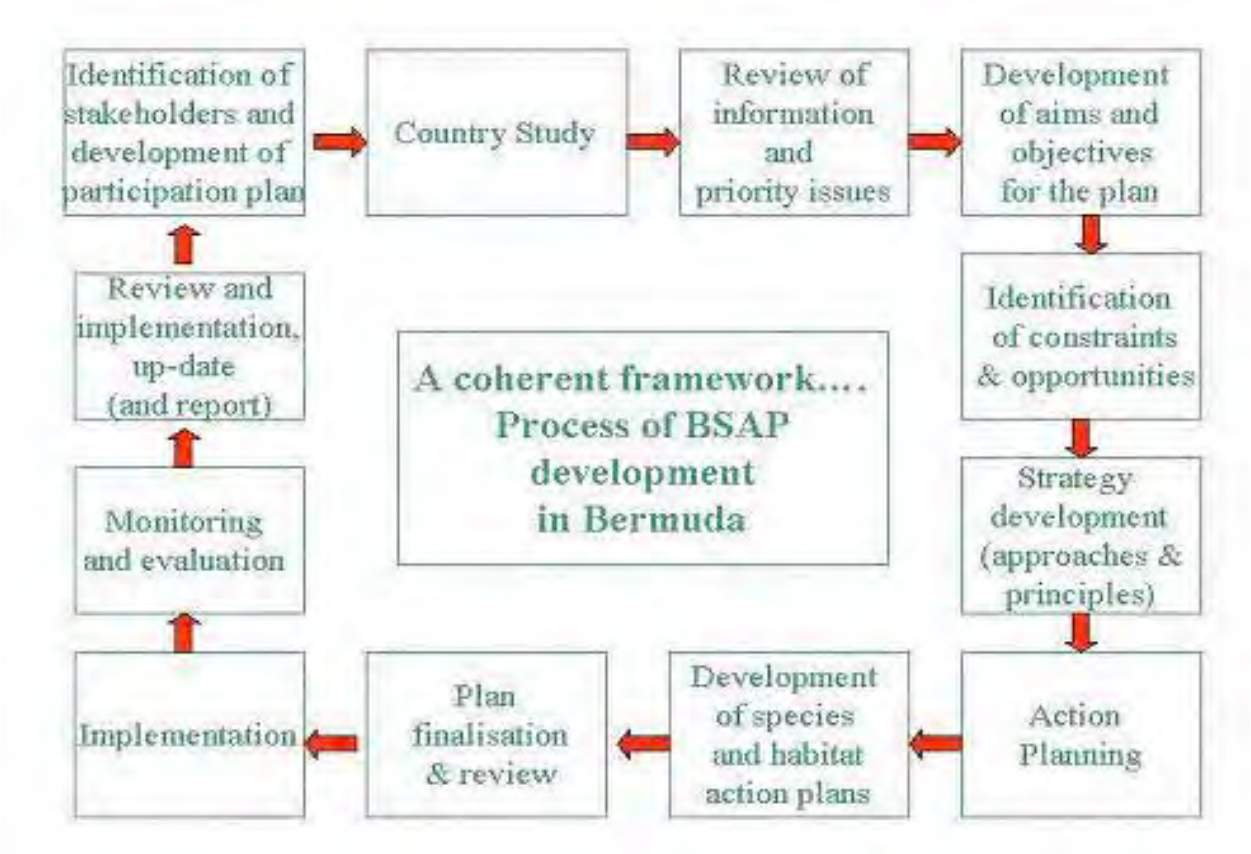
Bermuda's economy, through tourism, recreational activities and international business, is intrinsically dependent on the health of its natural habitats. However, with a resident population of 60,000 inhabiting a total land mass of 50 km^2, and entertaining up to 500,000 visitors a year, the pressure for further development poses a rapidly escalating threat to the Island's fragile ecology, and to its underlying economy.

Launched in 1999 through the UK's Darwin Initiative, the Bermuda Biodiversity Strategy and

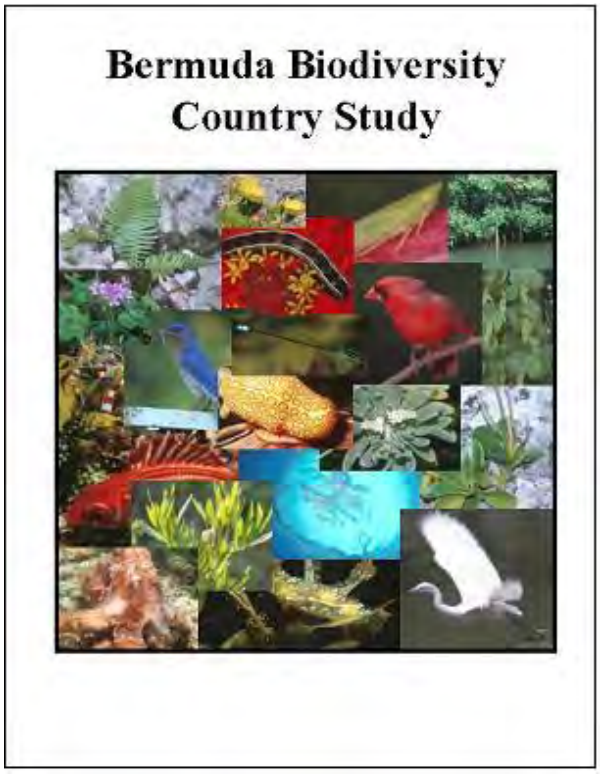
Action Plan was born out of the widespread recognition by many residents that there was an urgent need for a coordinated, community-based plan for conserving our increasingly threatened biodiversity. There is no doubt that in many areas Bermuda can boast an impressive conservation record. Nowadays, we are particularly fortunate to have many organisations (both governmental and non-governmental) and individuals working hard towards protecting our biodiversity. However, in many instances two different groups are working separately to tackle exactly the same issues. More significantly, in the absence of a common vision for conservation, we often find our efforts diluted by conflicting, albeit well intentioned, activities. Given the limited human and financial resources, it was recognised that a more logical approach would be one in which we first work together to develop a common vision for conservation and then to identify and address the problems and solutions, through the development of a coordinated series of actions.

At the outset it was felt that, if the BSAP was to be adopted and 'owned' by the whole community, then a participatory approach would be necessary. In a sophisticated society like Bermuda's there are many conflicting needs. Only by reaching out and inviting broad community participation, could we ensure that the Plan was relevant and achievable; that it was based on an understanding of how environmental, social and economic factors relate to one another; and that, at the end of the day, it is adopted and put into action by a community of partners.

To this end, the development of the BSAP involved several stages. A 7-member management team was set up with staff from the Bermuda Zoological Society (BZS) and Bermuda Aquarium Museum and Zoo (BAMZ), (an NGO and a Government facility). Being able to drive the project through these two organisations was essential to its success. Their long-standing, well-respected partnership has the support of the local NGO community as well as the ear of Government – a factor that has contributed enormously to the overall buy-in to the project. With 4,000 members, the BZS also has the interest of about 16% of the local population, facilitating outreach significantly. A steering committee, comprising 12 members of the community representing Government, the NGOs and the private sector was also established to provide guidance and ensure objectivity. Finally, the biodiversity planning expertise of Drs Abigail Entwistle and Nigel Coulson from Fauna and Flora International was secured to help develop the strategy and participation plan, and facilitate the planning workshops. They provided the following framework for the BSAP process (see below).



"….Preheat the oven in preparation"



With input from many local sources, the next step was an audit of what we know about Bermuda's biodiversity, what measures are in place to protect it, and hence where the gaps lie. This audit was collated and published by the Bermuda Biodiversity Project team in the form of the Bermuda Biodiversity Country Study, a colourful 103-page document which provides an overview of the status of Bermuda's biota, identifies the most critical issues facing the conservation of the Island's bio-diversity and attempts to place these in the context of the social and economic needs of the community. Over 70 people contributed to the material in the Study, which was reviewed as a draft by about 100 people. This document proved an unexpected success – its easy style and brevity engaged people across the community, including many of the politicians.

"….Prepare and gently fold in key ingredients"

The support and engagement of the Government was obviously critical to the whole BSAP process. Meetings were held with members of the Cabinet to secure their buy-in with the result that official support was given to the initiative in the Government Throne Speech in November 2000.

"….Add the remaining ingredients and stir vigorously"

Armed with the information in the Biodiversity Country Study, two strategic planning workshops were held in 2001with over 60 participants. The focus of these meetings was to:

- prioritise the issues and identify constraints and opportunities for conservation;
- develop an aim, a set of guiding principles and 12 key objectives.

"….Strain the mixture to concentrate the flavour"

12 Objectives

- Improved coordination, collaboration and communication between key stakeholders
- Integration of biodiversity conservation throughout Government
- Improved biodiversity education and training
- Increased public awareness
- Increased active participation by the community
- Provision of appropriate economic incentives
- Revision of legislation to address gaps
- Ensuring effective enforcement
- Revision and development of management plans for species and habitats
- Strengthening of protection through protected areas system
- Increased management-oriented research and monitoring
- Securing of public and private financing

In developing these objectives, The Convention on Biological Diversity (CBD) was used as a framework. Not only did this ensure full consideration of

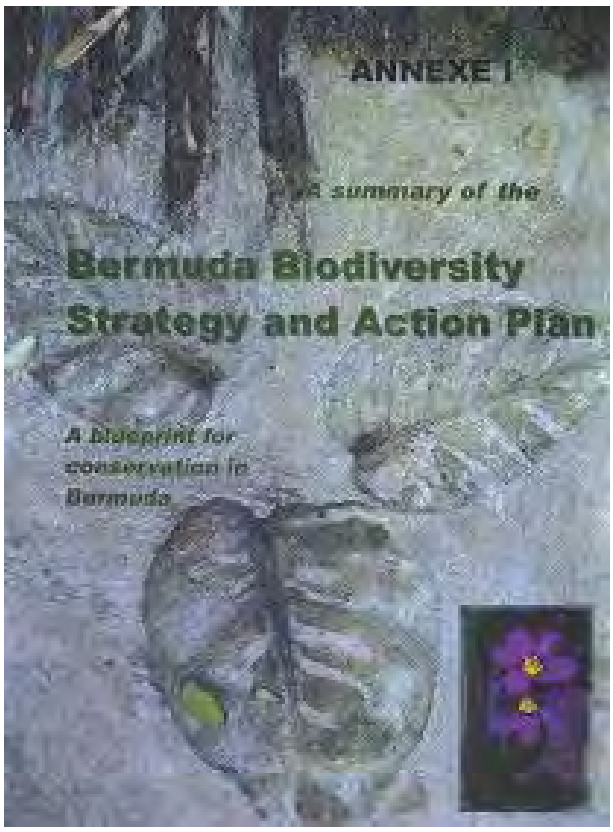
the various requirements of the CBD, an internationally agreed framework for biodiversity conservation, but it has also ensured more straightforward reporting of our progress in the future. The UK Government signed and ratified the Convention on Biodiversity on behalf of the UKOTs, but Bermuda is currently seeking to conclude the CBD in its own right.

Once the objectives were defined, 12 working groups, comprising local experts, were established to develop the specific actions and activities required to fulfil them. This included setting measurable targets for outputs as well as a time-frame and budget. It was agreed that, overall, the Plan would have a 5-year time-frame. Together, the objectives, actions and activities represent inter-related approaches to biodiversity conservation. Complementing these more generic actions has been the development of a series of specific action plans for key species and habitats considered to be particularly vulnerable, or, in the case of certain invasives, particularly threatening to our native species. Specific workshops were held to help support the development of these action plans. Each activity within the BSAP has been assigned to a lead agency, which has agreed to coordinate activities with other partners to achieve the targets. These lead agencies have an essential role to play in ensuring that the momentum of the Plan is not lost, and that activities are encouraged which truly support the aims of the Plan. Wherever appropriate, activities have been linked to other projects currently being implemented or planned. To this end, the BSAP does not occur in isolation, but rather complements existing programmes so as to avoid duplicating or conflicting with them. This includes Development Plans, local Agenda 21, the UK Overseas Territories Environment Charter, management plans for nature reserves and parks, and so on.

At every stage of the process efforts have been made to try and ensure wide information dissemination to the public, from articles for local magazines, newsletters, newspapers, to presentations at local exhibitions, as well a television and cinema advertising campaign, and a sermon from the pulpit in the Anglican Cathedral on Conservation Sunday.

"….If their appetite has been sufficiently whetted, many guests will be content to lick the bowl, instead of waiting for the meal"

Perhaps one of the most encouraging aspects of the BSAP process was the extent to which the workshops themselves inspired and encouraged the local conservation community, prompting many groups to start implementing new activities, long before the Plan was actually completed and launched. It was a combination of this enthusiasm, and the opportunity for widespread publicity offered by the



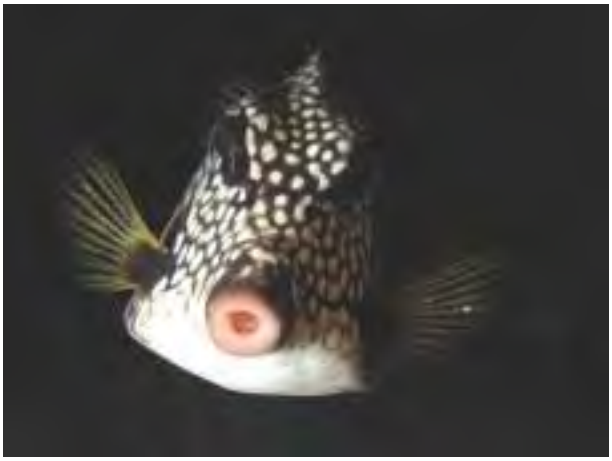
UKOT Conference on Conservation in Bermuda, that finally inspired the completion of the Plan and its official launch by the Minister of the Environment and the BSAP Steering Committee during the conference. In a continuing effort to engage the wider community, the launch was accompanied by the distribution of a glossy version of the Plan which highlighted the key points of the Country Study, summarized the BSAP process, and outlined the aim, guiding principles, objectives and key actions.

In conclusion, it is hoped that, although ambitious, the Biodiversity Action Plan will stimulate a more focused, and coordinated approach to biodiversity conservation. Certainly, it has already created an avenue for strengthening existing partnerships and projects, as well as for establishing new ones.

Acknowledgements to the following for all the culinary skills:

Lynda Johnson and Susan McGrath-Smith from the BSAP management Team; Fauna and Flora International and particularly Abigail Entwistle, Nigel Coulson and Kerstin Swahn; Colin Clubbe; Karen Varnham; and all the many locals who participated in the development of the BSAP, particularly the Steering Committee, and the working groups); and for their financial support; the UK Darwin Initiative, the Bermuda Government, the Kenridge Fund, the Ernest E. Stempel Foundation and the Bay Foundation.

This is Contribution No. 60, Bermuda Biodiversity Project (BBP), Bermuda.



Facilitating the development of a plan in an example UKOT (Turks & Caicos Islands) for strategic action under the Environment Charter

Michelle Fulford-Gardiner, TCI Dept of Environmental & Coastal Resources; Dace McCoy Ground & Mike Pienkowski, UK Overseas Territories Conservation Forum facilitators

Fulford-Gardiner, M., Ground, M.C. McCoy, Pienkowski, M.W. 2003. Facilitating the development of a plan in an example UKOT (Turks & Caicos Islands) for strategic action under the Environment Charter. pp 39-45 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

On 26 Sept 2001, the UKOTs and HMG signed Environment Charters which include statements of principles and undertakings by both parties in respect of integrating environmental conservation into all sectors of policy planning and implementation. The first undertaking of the UKOTs was to formulate a detailed strategy for action, and HMG's first undertaking was to help build capacity to support and implement integrated environmental management. Informal feedback from the Territories both to the FCO and the Forum indicated that the first need was for facilitation in developing these strategies for action. This project provides for facilitation for a first example UKOT to serve as a model to others.

In October/November 2002, the emphasis of work was on (a) analysis of the Environment Charter documents to produce a structure for planning; (b) undertaking interviews with stakeholders in order to identify current activities which contribute to Environment Charter commitments and any perceived gaps; (c) a workshop of key stakeholders to verify the approach, check and further collate the information on current relevant activities, and start formally to identify gaps, both substantive and of information.

During the January/February visit, the emphasis was on (a) filling the major information gaps identified in the first round, particularly undertaking major work on legislative aspects and multilateral environmental agreements, (b) using a workshop-centred approach to develop headline action points from the matrix developed in the previous round, and (c) presenting the approach to Executive Council and agreeing the proposed timetable of the stages involving ExCo.

The main activity during the April/May 2003 visit was to prepare, conduct and analyse the results of a workshop open to wider participation. This was held on 29th April at the National Environment Centre in Providenciales. The main purpose was to take the initial strategy for action produced as a result of the previous workshops, and begin to assign priorities within this.

As agreed at the presentation to Executive Council on 29th January, a recommended strategy for action should go before ExCo in August, with a final version (from this establishment phase), modified in the light of any revisions necessary, probably in November.

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Dr Mike Pienkowski, UKOTCF Chairman, 102 Broadway, Peterborough PEI 4DG, UK. pienkowski@cix.co.uk

Background

On 26 Sept 2001, TCI and other UKOTs signed with HMG Environment Charters which include statements of principles and undertakings by both parties in respect of integrating environmental conservation into all sectors of policy planning and implementation. The first undertaking of TCI and the other UKOTs was to formulate a detailed strategy for action, and HMG's first undertaking was to help build capacity to support and implement integrated environmental management.

Informal feedback from the Territories both to the FCO and the Forum indicated that the first need was for facilitation in developing these strategies for action. Following discussions between the Forum and the FCO, it was agreed that a pilot project would provide for facilitation for a first example UKOT to serve as a model to others.

The Forum has been working closely with the FCO from the inception of the idea of Environment Charters through to their adoption, and therefore has a strong background in this area and a great desire to see the Charter process succeed. The Forum's network of member organisations throughout the UK and the UKOTs gives it unique resources and access both to UK expertise and within the governmental and non-governmental sectors of each of the UKOTs. Its long track record of capacity building and facilitating work within the UKOTs gives it unique knowledge of how governments and NGOs work in the UKOTs and how a complex planning exercise can be successfully carried out. This broad expertise gives the Forum the capacity not only to carry out a successful exercise with the example UKOT but to apply the process and lessons learned to create guidance useful to all the UKOTs.

In TCI, the first undertaking to formulate a detailed strategy for action, with the assistance of HMG, was was given priority during the TCI Strategic Country Policy Dialogue 2002. Both Governments through informal discussions, decided that there was a need for facilitation in developing the strategy for action. Consultations facilitated by H.E. the Governor of Turks & Caicos Islands and the Hon. Minister for Natural Resources resulted in approval by the Executive Council of TCI that this UKOT should be the pilot, and confirmed the facilitators as Dr Mike Pienkowski and Mrs Dace Ground of UKOTCF (who have wide experience of working in both official and NGO situations), working with a local committee.

This core team to facilitate the implementation of the strategy for action to implement the Charter was to be formed immediately. Executive Council later confirmed this as:

Under Secretary, Ministry of Natural Resources
Director, Department of Environmental and Coastal Resources
Deputy Director, Department of Environmental and Coastal Resources

Turks and Caicos Executive Council at the time of deciding to proceed with the project

Director of Planning
Government's Chief Economist
Provo Pollution Task Force Representative
Chief Environmental Health Officer
Governor's Office Representative
Attorney General's Chambers Representative
Ministry of Education Representative
Director of Turks and Caicos National Trust
Chairman, National Parks Environmental Advisory Committee (NPEAC)
Turks and Caicos National Museum Representative
Hotel and Tourism Association Representative
Chamber of Commerce Representative
UKOTCF Facilitator (Mrs Dace Ground)
UKOTCF Facilitator (Dr Mike Pienkowski)
Project Manager, Coastal Resources Management Project
Deputy Director of Planning

The facilitation exercise comprised a series of activities covering 2-3 week periods in TCI, between which the facilitators analysed the results of consultations and discussions, clarified points as necessary with TCI colleagues, and prepared for the next round of consultations.

First round of consultations

In the October/November 2002 visit (detailed in the first progress report), the emphasis of work was on the following aspects:

a) analysis of the Environment Charter documents to produce a structure for planning and, in the immediate future, for interviewing stakeholders, together with consultations to identify those stakeholders;

b) undertaking interviews with stakeholders, with the objectives of (i) identifying current activities which contribute to Environment Charter commitments and any perceived gaps; and (ii) identifying current awareness of the Environment Charter and the issues it addresses;

c) a workshop of key stakeholders to verify the approach, check and further collate the information on current relevant activities, and start to identify gaps, both substantive and of information; in particular, the purposes of the Workshop were, for each of TCI's 11 undertakings in the Environment Charter:

1. agree on "desired outcomes"
2. identify the most important response mechanisms
3. identify ongoing projects that address the issue
4. identify gaps
5. identify key issues for investigation/ evaluation.

d) between and after interviews and workshop, review and analysis by the facilitators in consultation with key local players, in order to refine the ongoing programme and the structure of the draft plan.

The workshop report was circulated along with legislative review summaries and the gaps therein, so that this could be checked by participants.

Other work
The first round of consultations identified interim short-term recommendations. Several concerned with the Environment Charter Working Group and Public Awareness were followed up within the later consultation rounds.

The proposal for initiating the development of a biological records centre, in the third recommendation, was completed and submitted, following the identification by the facilitators of a potential route and relevant advisory expertise for this, and consultations during the visit with the TCI partners potentially involved. The other aspect of information collation to be addressed concerns information in largely unpublished reports. A basic form to record systematically summaries of this information was developed .

Reviews of TCI legislation and of Multilateral Environmental Agreements

Two major pieces of work were undertaken in the period between the first and second round of consultations and carried through the second round.

The first concerned the question as to what extent the existing TCI legislation is able to address the needs being identified by this project, and what changes might need to be considered. The draft review of legislation resulting from this process was further discussed at the next workshop.

The second addressed the Multilateral Environmental Agreements, both those which already

apply to TCI and those which TCI has expressed some interest in joining. For these, it was necessary to identify to what extent TCI has the mechanisms to fulfil the commitments in the conventions and what changes would be needed. The analyses for the "Ramsar" Convention on Wetlands, the "Bonn" Convention on Migratory Species and the Convention on Biological Diversity were presented at the Workshop. The first two already apply to TCI. For the third, the limited range of issues which need addressing seems to indicate that TCI could approach UK Government to request that TCI be added to UK's ratification of that convention. The analyses were extended to cover the World Heritage Convention, the Convention on Trade in Endangered Species ("CITES"), the "Cartagena" Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region, the "London" Convention on the Prevention of Marine Pollution, and the Marpol Convention.

Second round of consultations

During the January/February visit, the emphasis was on

(a) filling the major information gaps identified in the first round, particularly undertaking major work on legislative aspects and multilateral environmental agreements,
(b) using a workshop-centred approach to develop headline action points from the matrix developed in the previous round, and
(c) presenting the approach to Executive Council and agreeing the proposed timetable of the stages involving ExCo.

Executive Council

The project Chairperson Mrs Michelle Fulford Gardiner, the Permanent Secretary Natural Resources Mr Terry Smith, and UKOTCF facilitators Dr Mike Pienkowski and Mrs Dace Ground, attended Executive Council on 29th January, at the kind invitation of H.E. the Governor and the Hon Chief Minister. ExCo members expressed strong support and encouragement for the project and its development into an integrated part of TCI procedures. ExCo took note of the proposed remaining stages of the project, welcoming further presentations as appropriate, and in particular the expectation that a recommended strategy for action would come before them in August, with a final version (from this establishment phase), modified in the light of any revisions necessary, probably in November. The idea of attractive, popular versions of these final products to help public awareness, was also welcomed. The Hon Chief Minister noted the importance of ensuring environmental aspects were taken fully into account in planning and considering development proposals, and thanked

Participants in the second workshop

the team for their work.

A press release issued by TCI Government Information Service was carried by TCI radio that morning.

Following the presentation to ExCo, a formal paper was prepared by the Ministry of Natural Resources and put before ExCo, resulting in the formal appointment of the project Working Group as outlined in the briefing paper .

Workshop

The meeting room of the Turks & Caicos National Museum was again kindly made available for the stakeholder workshop held on 5th February 2003, which was opened by H.E. Mr Jim Poston, Governor. The central purpose of the workshop was to develop the head-points of a strategy for action to implement the Environment Charter (as required under Commitment 1) from the matrix developed at the previous stakeholder workshop. To aid this, the facilitators had drafted head-points for those sections where these were obvious consequences of the matrix, and the meeting discussed and amended these as appropriate. For the more complex legislative-related points and the Multilateral Environmental Agreements (see above), analyses of these were used to inform the discussion, and generate head-points for action. For the high-level issues under Commitment 3, the starting point to generate discussion and hence headline action points was the matrix itself.

As in the previous workshop, as many as possible of the conclusions of discussions were recorded on a laptop computer linked to a projector, so that participants could check them as they were noted. Immediately following the workshop, the facilitators edited the strategy for action head-points document and circulated it to stakeholders for further checking. This was followed up with detailed discussions with key stakeholders.

The final strategy for action will need to provide more information than just the head-points, both for current work and for those new pieces of work identified. The facilitators provided a draft simple form for such information, and participants agreed to supply any comments on that form within 2 weeks. Subsequently the form would be used by stakeholders (assisted by facilitators where necessary) to record this key information for each project or other task.

One of the tasks for facilitators identified at the Workshop was to make available an updated list of the proposals from the National Trust and others for additions and modifications to the Protected Areas system, and this was done.

Awareness-raising

In the first round of consultations, it was agreed that many aspects of public awareness-raising on the Environment Charter would be integrated with the Sustainable Development Planning Initiative (SDPI) process as this spreads across the islands. Such integration should minimise the risk of confusion in the public's minds between differently titled, but essentially closely integrated, processes. Nevertheless, it was important to give some indications of the importance of the Environment Charter process to the future of TCI. This will be taken up most prominently by the Chief Minister (see Executive Council section above), supported by the locally based members of the project team, and particularly the Chairperson, Michelle Fulford-Gardiner.

In addition, several other opportunities are being developed and taken to raise awareness of the Environment Charter to targeted audiences. As a result of contacts in the first round of consultations, the Providenciales Chamber of Commerce carried the Charter as its front-page news in its winter 2002/3 issue, and a talk to the Chamber is planned. Dr Mike Pienkowski lectured the senior science students at the College on the Environment Charter and other issues. Both the ExCo presentation and the Workshops were the subjects of press-releases issued by the TCI Government Information Service; these were taken up by TCI radio and press media.

Recommendations for immediate action

As happened at the first workshop, issues were raised at the second workshop which were felt to warrant immediate action, rather than waiting for the completion of this process. The Working Group was very concerned about the erosion of the Protected Areas system by development. One of the root problems is that the boundaries of the Protected Areas System are not recorded on the Land Registry maps, so they appear to potential developers to be prime pieces of Crown land suitable for development. The following two items for immediate action were proposed:

> Lodge the boundaries of existing Protected Areas in the Governmental GIS system,

Planning and Land Registry by resourcing translation where digitised boundaries are already available and digitising of remaining boundaries. This should be done in stages so that easily identifiable areas such as offshore cays or sites with known block and parcel numbers can be lodged immediately, those which need only translation can be lodged as soon as possible and where surveys or other work are needed, a schedule can be established to ensure that the work is done with as little delay as possible.

Develop Protected Areas Policy with agreement at highest level to ensure that there is no further erosion of the PAS through inappropriate development. DECR has been working on this, but limited staff resources have slowed progress on this; resources must be allocated to facilitate immediate completion.

Third round of consultations

The main activity during the April/May 2003 visit was to prepare, conduct and analyse the results of a workshop open to wider participation. This was held on 29th April at the National Environment Centre in Providenciales. The main purpose was to take the initial strategy for action produced as a result of the previous workshops, and begin to assign priorities within this. The list of invitees was developed by the Working Group. All invitees received also a copy of the Environment Charter and the list of strategy action items (which was the main output based on workshop 2).

Within Workshop 3, the main parts of the draft action list were taken in six sessions. Within each session, one or two participants with particular interests in the topics of that session read through a shortened version of the document, which had the same numbering as the main document. The participants had the main document in front of them. The shorter version was projected on-screen. Participants were then invited to review and discuss that section and comment on priorities within it. The main conclusions were noted on screen, so that participants could check that their points had been recorded correctly. At the end of each session, participants were invited each to supply a "vote" on a simple form of their views of the top priorities (up to five each) within that session. At the end of the workshop, participants were similarly invited each to indicate their top five priorities overall based on the preceding discussions.

Subsequent analysis showed good agreement between the views expressed in discussion and those recorded on the "voting" forms. These analyses and the comments made throughout the workshop were integrated with the base document to produce the proposed Strategy for Action to implement TCI Government's commitments under the Environment Charter and the "Strategy for

Stakeholders in the third workshop, at the National Environment Centre

Action: Initial Priority Projects" from that. These outputs were checked with key members of TCI's Environment Charter Working Group and participants in the Workshop before incorporation in this Progress Report.

Next steps

The Strategy for Action will be collated and the core group will make recommendations. As agreed at the presentation to Executive Council on 29th January, a formal presentation on the recommended strategy for action will be made to Executive Council by the Chair of core group and UKOTCF facilitators. This is planned for August 2003, with a final version (from this establishment phase), modified in the light of any revisions necessary, probably in November 2003. Subsequently, popular versions of these final products to help public awareness, could be prepared.

The final strategy for action will need to provide more information than just the head-points, both for current work and for those new pieces of work identified. The facilitators have provided a draft simple form for such information and participants in the workshop process have agreed to use these (assisted by facilitators where necessary) to record this key information for each project or other task. This information can then be included in the material for the final document of this development phase, in November.

A draft of the general guidelines document will be prepared by the facilitators, so that this could possibly be used in the other UKOTs.

TCI Government will ensure that Departments/ Agencies are charged with the responsibility of carrying out actions under the plan in a timely fashion. The core group will be kept intact, so that they they can develop into an advisory board to ExCo to manage the ongoing process. In addition, TCI members would like the Forum to maintain a review role after the current facilitation project.

Strategic conservation in a non-UKOT: The Bahamas National Park System

Susan Larson, Deputy Director, Bahamas National Trust

Larson, S. 2003. Strategic conservation in a non-UKOT: The Bahamas National Park System. pp 46-49 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

This presentation is a summary of recent parks and protected areas accomplishments in the Bahamas and the unique organization behind them.

Susan Larson, Bahamas National Trust, PO Box N 4105, Nassau, Bahamas. slarson@bahamas.net.bs

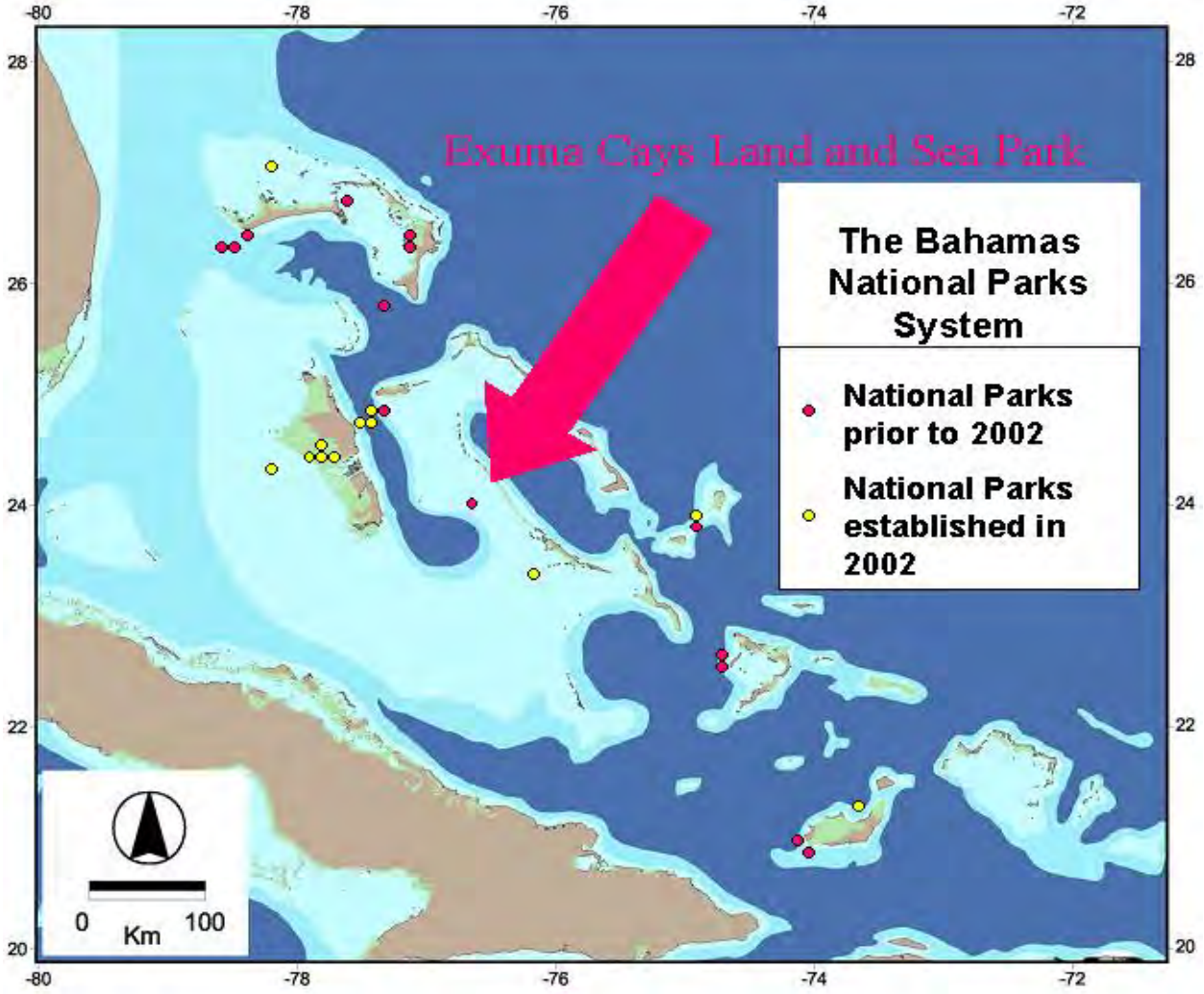
The Bahamas National Trust was created by Act of Parliament in 1959 and mandated with the management and development of national parks. The Trust has numerous unique characteristics. Some of them in particular are illustrated here with an explanation as to how these unique features give the Trust certain strengths.

The mandate of the Bahamas National Trust is defined in an Act of Parliament. The Act mandates the Trust to exist and gives it a specific charge and structure. The Trust "shall" exist, says the Act, will ensure the permanent preservation of natural resources and areas of outstanding beauty and historic interest, and will do so as a private organization, outside of governmental structure or authority. Although the Trust is loosely referred to as a NGO in conservation jargon, it is more accurately a quasi non-governmental body because of its Act.

The Bahamas National Trust truly enjoys the best of both worlds – a NGO with a legislated mandate.

The specific charge of national park management and development also makes the Trust unique. No other NGO or quasi-NGO in the world that we are aware of manages a country's entire national park system. Outside of political change and influence, management of national parks in the Bahamas has been balanced and stable for nearly half a century. Non-governmental management of National Park Systems is seen more and more as a very viable alternative to government-run systems by conservationists and park managers the world-over.

The Trust's collaborative structure is also noteworthy. Its policy-making body is the Council, comprised of elected Trust members, representatives of Bahamas Government Agencies and prestigious overseas organizations such as The Smithsonian Institution, the American Museum of Natural History, the U.S. National Parks Service, and the National Audubon Society, to name a few. Through the mandated structure, the private sector, Government, and scientific interests are represented. Numerous partnerships emerge out of the collaborative structure, as does a wide and invaluable network of advisors which brings added dimension to the work of the Trust.



Perhaps most remarkably, the Bahamas National Trust is self-funded. Only 8% of the Trust's annual operating budget comes from the government. In 1988 the Trust created The Heritage Fund, one of the first conservation endowment funds in this hemisphere. Private donations constitute the fund's capital and over the years, the Heritage Fund has grown into generating nearly 60% of the Trust's annual operating budget. As a result, the Bahamas Government is relieved of the significant financial burden of park management and monies raised for the fund are not lost in the Public Treasury – a very appealing factor to donors.

The Bahamas National Trust has enjoyed more than 4 decades of significant accomplishments across a wide spectrum of themes, but perhaps none was more significant than that which occurred last year. In April of 2002 the Bahamas doubled the size of its National Park System overnight. No other country has ever done this.

In signing over the new national parks to the National Trust, former Bahamas Prime Minister Hubert Ingraham spoke of:

- the obligation of signatory nations to the Convention on Biological Diversity to step up efforts in "*in-situ*" conservation
- the diverse features and values the new additions to the Bahamas National Park System possessed
- and most importantly – the viability of non-consumptive use of natural resources to the Bahamian economy

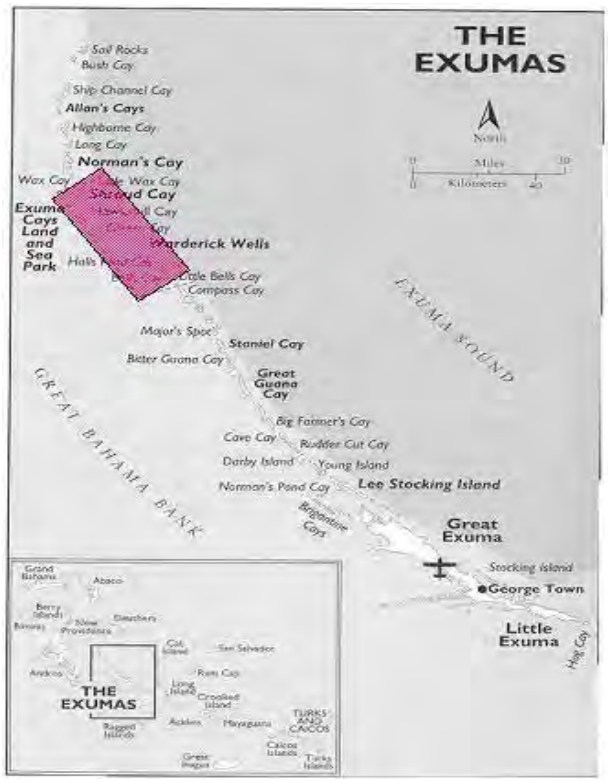
Several key factors were behind the unprecedented park expansion. The focus here is on the most important one.

Almost in the center of the Bahamian archipelago is the Exuma Cays Land & Sea Park (ECLSP). It is our grandfather national park; its establishment-in-principal actually pre-dates the passing of the Bahamas National Trust Act. Encompassing 176 square miles of land- and sea-scapes, the Exuma Park is also one of the world's first land and sea

parks to exist under a single jurisdiction.

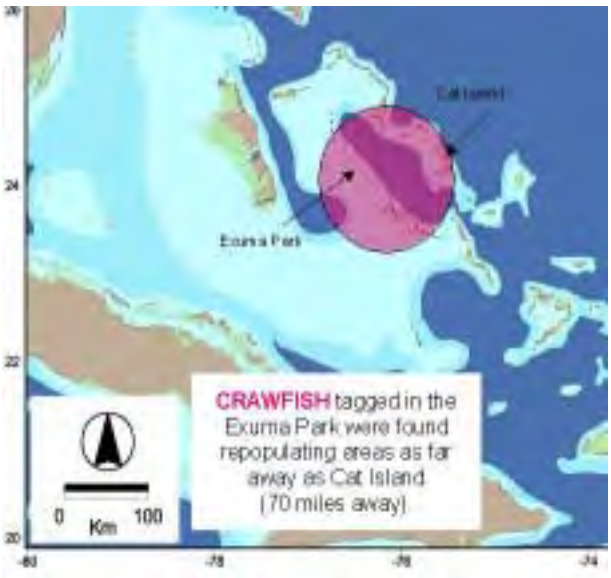
Within the Bahamas National Trust Act is the power for the Trust to write by-laws to assist with management objectives in park areas. This is yet another unique strength of the organization. During the early history of ECLSP limited fishing was allowed. But, in late 1970s and 1980s the Trust believed unsustainable fishing practices and management regimes were increasing nationally and that important commercial fishery stocks were declining.

To counter this, the Trust declared the entire 176-square mile Exuma Park a "no-take area" in 1986.

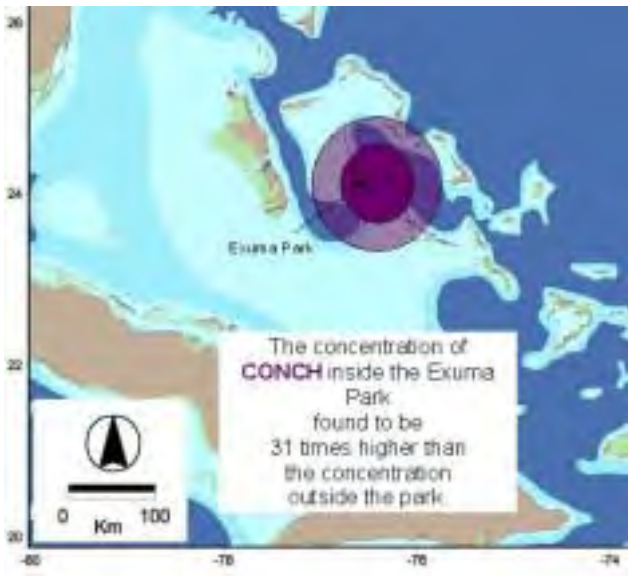


The Trust also began to promote more vigorously the need for "conservation" in the national fisheries plan and worked with local communities and fishermen to heighten awareness of the need to protect marine resources.

Wanting data on the "holy trinity" of the Bahamian fisheries – crawfish, conch, and grouper – the Trust also promoted the need for research and science in the Exuma Park to document the affects of the no-take designation.



In the 1990s the results began to come in … and they were quite impressive. Crawfish tagged in the Exuma Park were found repopulating areas as far away as Cat Island, a distance of 70 miles. Tagged Grouper were found off of both north and south Long Island, 150 miles away. Another study concluded that 74% of all Grouper in the northern Exuma region were coming from within the Exuma Park. And with regard to conch, it was found that the concentration of conch inside the Exuma Park



was 31 times greater than the concentration of conch outside of the park boundaries. It was conservatively estimated that through larval dispersal this concentration provided several million conch outside the park for fishermen to harvest each year.

The Bahamas National Trust took these results to partners and stakeholders and the groundswell of support and enthusiasm was significant.

- Fishermen began to realize the value of the park to their livelihood.
- At a Coral Reef Task Force Meeting, the Government of the Bahamas announced a policy decision to protect 20% of Bahamian marine ecosystems.
- The Department of Fisheries began to implement a network of marine protected areas.
- The Exuma Park was used as a model of success abroad.


Local Communities


Government Officials


Fishermen


School children

In 1986 the Trust took the bold action to declare the Exuma Park a no-take area. In a sense, it was the conservation equivalent of “Just do it”. With little science in place to support it, the Trust was firmly committed to the notion that as with terrestrial resources, marine resource conservation required habitat conservation. Subsequently to 1986, the term marine fishery reserve (MFR) was coined and has become a highly-promoted tool in sustainable management of fisheries. The Bahamas Department of Fisheries has embraced MFRs as an effective management tool and five sites are now “in transition” towards formal designation.

The extraordinary benefits to fisheries are coupled with equally significant benefits to tourism and education. Having marine and terrestrial life in abundance, growing to large sizes and unmolested, the Exuma Park is a mecca for tourists and an invaluable outdoor classroom for Bahamian youth. People began to see the tangible benefits such parks provide to themselves and called for parks in their own areas. And it was against this backdrop, created in large part by the success of the Exuma Park, that the doubling of the Bahamas National Park System in 2002 occurred.

Windows of opportunity in small island states can be miniscule and fleeting and the delicate balance between science, community support, and political will can be easily be lost – and with it goes the opportunity. From time to time in the conservation world the value of paper parks is questioned. But in our experience in the Bahamas, getting a Park established is the thing. Point in case is the Exuma Park itself, now our crown jewel. It began as a paper park and sat un-manned for half of its history.

Getting the parks established was the thing that drove the national parks expansion accomplishments of 2002. Stakeholders contributed significantly to the definition of areas and community support was strong; science existed at varying levels and will be built upon; political will was there. With this formula ten new parks, encompassing more than 350,000 acres, were established overnight. The specifics of management regimes will be worked out next.

Implementing the St Georges Declaration of Principles for Environmental Sustainability in the Organisation of Eastern Caribbean States (OECS) and the UK Overseas Territories Environment Charter: No Conflict

Gerard Gray, First Vice-President Montserrat National Trust, and Director of Agriculture, Montserrat Government

Gray, G.A.L. 2003. Implementing the St Georges Declaration of Principles for Environmental Sustainability in the Organisation of Eastern Caribbean States (OECS) and the UK Overseas Territories Environment Charter: No Conflict. pp 50-51 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The Caribbean Overseas Territories that are members of the Organisation of Eastern Caribbean States (OECS) have signed the St Georges Declaration of Principles for Environmental Sustainability in the OECS, and therefore must implement the instruments of the Declaration as well as those of the Overseas Territories Environment Charter. Close scrutiny of both documents has indicated that they are quite similar and there is no philosophy or provision in one that is in discord with the other. Therefore any course of action that will lead to the satisfactory implementation of one will satisfy the execution of the other.

In order to implement the St Georges Declaration, Montserrat will develop a National Environmental Management Plan. To achieve this a number of stakeholder consultations will be convened nationwide to include Government Agencies, Non Governmental Organisations, Focus Groups and the wider Civil Society to prioritize for action the major environmental issues. Priority areas will then be included into the Public Sector Investment Programme (PSIP), which sets our Government's overall investment programme. Implementation is assured when elements of the PSIP are subsumed into the respective work programmes of the Government Ministries, Departments, Agencies and Statutory Bodies.

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Montserrat is party to the UKOT's Environment Charter and the St George Declaration (SGD) of Principles for Environmental Sustainability in the Organisation of Eastern Caribbean States (OECS) and must implement the provisions of both instruments.

The UKOT Environment Charter and the SGD are similar. There is no philosophy or provision in one that is in discord with the other. The basic document of the SGD is more detailed than that of the UKOT Environment Charter (but the first requirement of the latter is to develop a strategy for action to implement it). There are no substantive differences between the two documents; differences are mainly those of presentation. SGD is organised around 21 points and the UKOT Environment Charter around 10 principles.

Because of these similarities, satisfactory implementation of one instrument will satisfy the execution of the other. The strategy employed by Montserrat for implementation of these instruments was developed by the OECS-ESDU in collaboration with Member States. The process by which the SGD was arrived at is critical to its successful implementation.

St Georges Declaration

The St Georges Declaration was sanctioned by the OECS Environment Policy Committee. It was developed with broad-based stakeholder participation at the national and regional levels (community, interest groups, government agencies and the

private sector).

National Environmental Management Strategy
The National Environmental Management Strategy is the main vehicle for bringing the environmental instruments to life. It employed nation-wide stakeholder participation to prioritise for action major environmental issues.

Sustainable Development Plan
The Sustainable Development Plan addresses key social, economic and environmental issues to guide development to meet Montserrat's Mission Statement. This also employed broad-based stakeholder participation.

Public Sector Investment Programme
The Public Sector Investment Programme (PSIP) outlines government's overall investment programmes on an annual basis. This involves a priority of priorities, implemented via annual work programmes.

Annual Work Programmes
PSIP is put into action by inclusion in:

- Work programmes of Government Agencies, NGO's, Statutory Bodies
- Private Sector and Community Projects.

Reporting Mechanism
A progress report is presented to the EPC annually. It reports on action taken and outputs for each principal identified in the work programme.

Take home message
The process is important to successful implementation, because it:

- Elucidates relevant issues
- Ensures stakeholder ownership and participation.

It must be subsumed into the regular work programme:

- Ensures some progress, even with limited funding
- Otherwise becomes onerous, and does not get the attention it deserves.

Monitoring and evaluation important to gauge progress.

Conclusion
The implementation process used on Montserrat allows for the satisfactory execution of the UKOT Environment Charter and the St Georges Declaration.

Statutory nature conservation on a small island: Developing a strategy for the Isle of Man

Elizabeth Charter, Department of Agriculture Fisheries and Forestry, Isle of Man

Charter, E. 2003. Statutory nature conservation on a small island: Developing a strategy for the Isle of Man. pp 52-58 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

This paper provides a brief outline of statutory nature conservation on the Isle of Man and the development of a conservation strategy over the last 5 years. The paper covers the strategic planning process. It has been a process rather than the production of a document although a Conservation Strategy document is now required. The other aspects discussed are the relationship between the Island's legislation and the EU, the role of International Conventions, the implementation of the Wildlife Act 1990, the various levels of wildlife and habitat protection and how the government works through partnerships with other organisations and individuals.

The paper draws attention to some of the particular issues for small islands and their administrations, the importance of biological recording and the particular value of conservation and heritage organisations, and of individuals in the rate of progress. Other small administrations may recognise the stages of progress and the constraints as having similarities to their own. The process on the Isle of Man is not a model or blueprint but, by presenting it in this forum, the aim is to stimulate debate.

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Introduction to the Isle of Man

The Isle of Man is in the centre of the British Isles, in the Irish Sea. It covers 227 square miles and has a population of 76,000. It is a UK Crown Dependency with a governor. Our parliament, Tynwald, was established more than 1000 years ago, in 979 AD, by the Vikings. It is not part of European Union but has to operate in harmony with many EU subsidies and legislation through being part of a common trading area with the EU. Selected European legislation is adopted but generally not in the area of environment. State aids have to be notified. The island signs international conventions through the UK.

The island has a number of important and successful populations of birds, notably the chough (pictured) and the hen harrier. Manx shearwater numbers on the Calf of Man (the islet off the south coast) are recovering as rats are controlled. Basking sharks frequent Manx waters and, mysteriously, the lesser mottled grasshopper (pictured) occurs at one Manx site and nowhere else in the British Isles. The Isle of Man cabbage is not an endemic or a very cabbage-like plant. It occurs in several other places around the Irish Sea but only at two sites on Mann. There are in fact no Manx endemic species (although probably some sub-species or genotypes).

There are two protected areas at present, the Ayres National Nature Reserve which is a strip of coastal grassland, dunes, shingle and heath in the north and the Langness Peninsula Area of Special Scientific Interest in the south, home of the rare grasshopper. A representative suite of designated areas has yet to be established.

Until 5 years ago the majority of the nature conservation was undertaken by voluntary organisations or less actively by the Manx National Trust (a government agency) and the Forestry and Lands Board, through land ownership. The progress of conservation can be seen in the establishment dates of organisations and the passing of legislation.

Organisations

- 1879 Manx Natural History and Antiquarian Society
- 1886 Manx Museum founded
- 1935 Society for the Preservation of the Manx Countryside
- 1967 Manx Ornithological Society
- 1973 Manx Nature Conservation Trust (Wildlife Trust)
- 1989 Manx Farming and Wildlife Advisory Group
- 1990 Manx Bat Group and Manx Chough Project
- 1995 The Basking Shark Society
- 1998 Manx Bird Atlas
- 2000 Manx Rivers Improvement Association

Legislation

- 1867 Sea Gull Preservation Act
- 1932 The Wild Birds Protection Act
- 1955 Protection of Birds Act
- 1956 Prevention of Damage by Agricultural Pests Act
- 1959 Manx Museum and National Trust Act
- 1963 Destructive Imported Animals Act
- 1980 Wild Animals (Restriction on Importation) Act
- 1981 Endangered Species (Import and Export) Act
- 1990 Wildlife Act.

The island is signatory to the following conventions and agreements:

- Convention on International Trade in Endangered Species of Fauna and Flora **(CITES),**
- **Bonn** Convention on the Conservation of Migratory Species of Wild Animals (CMS),
- the Bonn Convention Agreement on the Conservation of Bats in Europe (**EUROBATS**),
- **Bern** Convention on European Wildlife and Natural Habitats,
- **Ramsar** Convention on Wetland Conservation,
- Agreement on the Conservation of the **African-Eurasian Migratory Waterbirds** (under the Bonn Convention),
- **OSPAR** Convention for the Protection of the Marine Environment and
- the Agreement on Conservation of **Albatrosses and Petrels** (Bonn).

However the island is not yet a signatory to the Convention on Biological Diversity.

Before the 1980s conservation was progressed to a great extent through the dedicated effort of individuals or groups of committed people. The major milestones in the development of conservation have been the establishment of the Biological Records Centre in the 1980s, which provided the data for listing rare and endangered species for the schedules of the wildlife legislation, and the

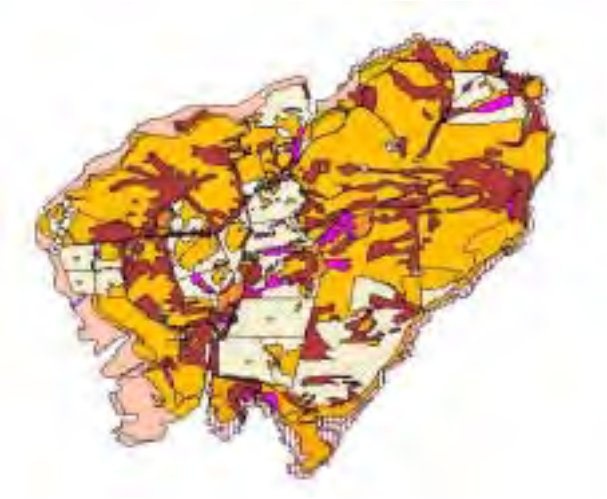
Wildlife Act 1990. Following the passing of this Act, Government undertook a thorough survey of habitats and land use for the whole island. In 1998 the first two full-time conservation officers were appointed to progress nature conservation within the Agriculture office of the Department of Agriculture, Fisheries and Forestry. Following this, voluntary management agreements were negotiated with private land owners to conserve rare species (orchids, corncrakes and the rare grasshopper). The site designation on private land began in 2000 with Langness. To persuade land owners that habitats on farmland have a monetory value the pilot Agri-environment Scheme was brought in before further land was designated. This was an important element of the developing conservation strategy.

The conservation strategy

The need for a strategy immediately became apparent when the office was set up. It goes without saying that in nature conservation there is always much more that needs be done than can be done with the resources available, hence the need for priorities and a strategy. A ship's rope makes a useful metaphor for the conservation strategy; it is not very interesting in itself but a very valuable tool for holding us to our aims or keeping us moving in the right direction. With it we are less likely to be diverted from our purpose. It is made up of a number of strands. The legislation strand (Wildlife Act 1990) was in place when the office was established in 1998.

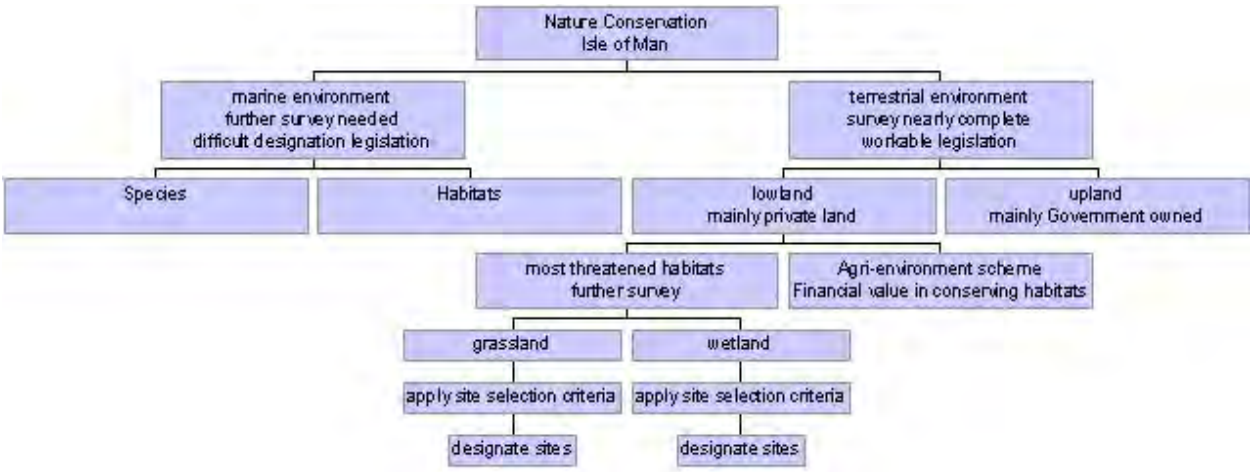
The biological data strand of the rope urgently needed strengthening. Considerable effort has been focused on the development of digitised habitat maps (see top of next column), with recent aerial photographs, to back up our advice and policies. Sound and up-to-date information on the abundance and distribution of habitats and species is the foundation stone of conservation and efficient use of resources.

Habitat survey of the Calf of Man map



At the start the principle was agreed that the Isle of Man should have a comparable standard of conservation service as the UK – an ambitious target. Our vision was to have protective designation status for a representative and ecologically viable sample of Manx habitats and to avoid further loss of the island's biodiversity.

Some strict prioritizing was required to progress the proactive work as the constant flow of reactive casework could easily take all the officers' time. The number of staff has grown to 4 full-time ecologists including a local graduate trainee ecologist. In parallel to this the budget has increased from less than £50,000 a year when the main activity was habitat survey before I began, to £280,000 a year in 2003/4. The diagram below shows the choices which have been made and how effort is currently focused on lowland farmland.



At the same time reactive work is strictly prioritised in order to delegate to Non Government Organisations or diplomatically drop work which does not relate to a protected species, a protected or potentially protected place or an invasive alien species.

The strands of the conservation strategy have needed to be spliced into the Department's business plan and the Government's corporate plan. The following objectives have been selected from the Conservation Office's Operation Objectives to take their place among the Department's Business Plan objectives.

- To ensure the Island's most scarce and important species of wild plants and animals, and their habitats are conserved effectively.
- To maintain the ecological health and biological diversity of the Island's countryside and marine environment.
- To control the trade in globally endangered species.

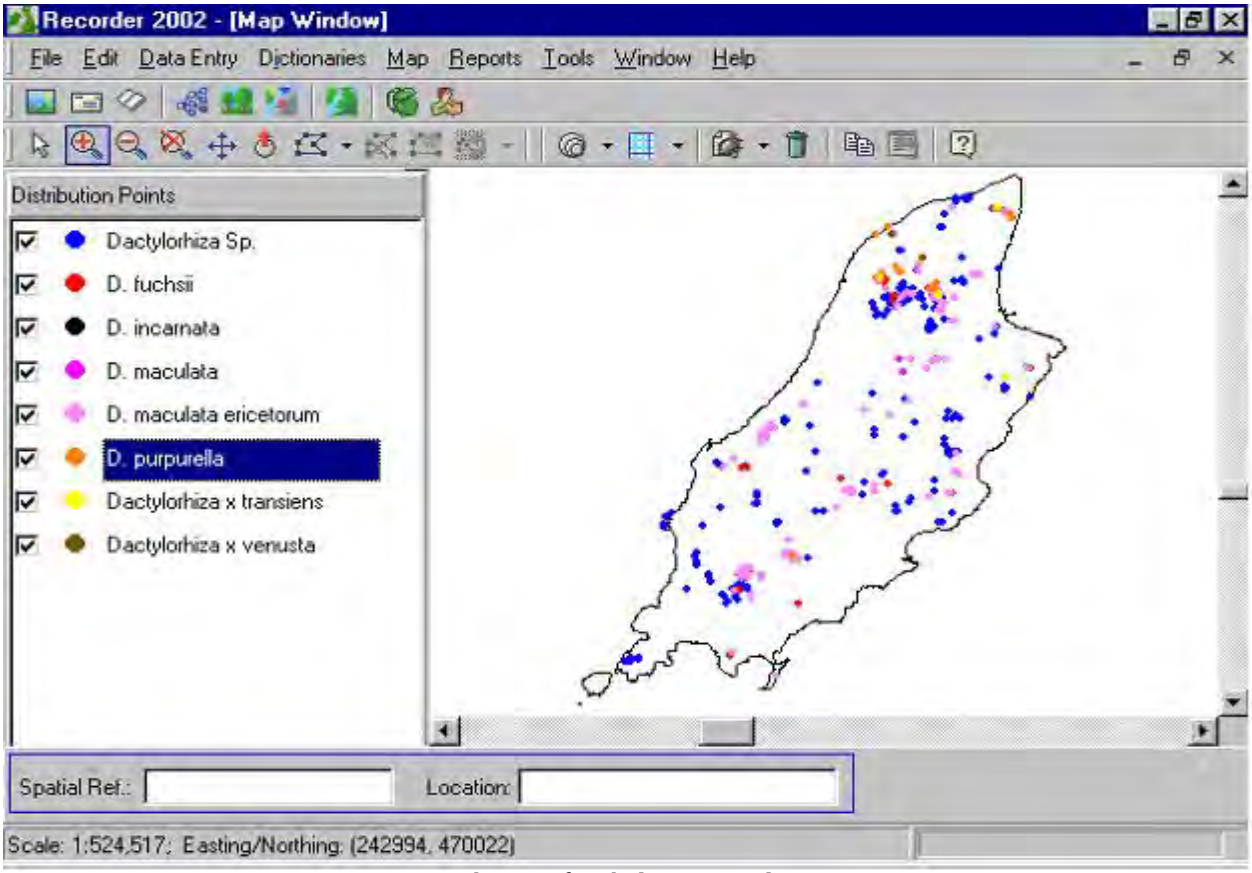
Each year key performance indicators are set. An example is the area or % of land use/habitat surveyed. 100% of the Island has had habitat survey in the last 10 years. More detailed and up-to-date survey will still be required before each site can be designated. Currently two sites have been designated as Areas of Special Scientific Interest, and their area (582 ha) could be a better indicator. Another example is ensuring all rare, endemic or endangered species are protected by legislation. The schedules of protected species are currently being reviewed. Currently there are 65,000 records in our database which uses the Recorder package, and this is another useful measure of progress.

Setting realistic targets has been one of the most difficult parts of the strategic planning process. These are our proposed targets although agreeing the resources required to meet them has some way to go:

- 10 % of land area (or 5,500 ha) to designate to protect best examples of all habitats by 2010,
- Management agreements on 50% of designated area (2,750 ha) by 2020,
- 1/5 of island's farms (100) in Agri-environment Scheme by 2010,
- Revision of rare species schedules every 10-12 years.

Priorities for small islands

To recap on the aspects of conservation which we have focused on.



Distribution of orchids on Recorder map

Biological recording and mapping
We have improved biological recording (see Recorder package screen on previous page) and mapping, including GIS (Arcview) and Phase 1 habitat survey based on the technique pioneered by the old UK Nature Conservancy Council. This included collecting all known survey data and identifying gaps for further survey, remembering that selecting indicator organisms can save time on surveying everything. The Island has brought in specialists (recently a moth specialist) to help train local people, as encouraging a group of local enthusiasts is often the most cost-effective way to undertake surveys and ensure a regular supply of records. We also need to ensure we have a new generation of naturalists growing up on the island (we help a young naturalists' club).

Site protection
The Wildlife Act enables the Manx government to designate National Nature Reserves, Areas of Special Scientific Interest (ASSI), Marine Nature Reserves and Areas of Special Protection for plants, birds and other animals. In addition we enter 5-year voluntary management agreements on fields of importance for rare species or on the whole farm through the Agri-environment scheme. Land under Manx Museum and National Trust ownership is protected by by-laws. The Manx Wildlife Trust have their own reserves and a set of criteria for selecting Wildlife Sites in the wider countryside. These latter will be a level of conservation value below ASSI. Currently criteria are being developed in our office to select the land for the ASSI series, based on the selection system in the UK.

Indigenous species protection legislation
Indigenous species protection legislation and maintaining the population integrity of indigenous sub-species and genotypes are very important to more remote islands. Manx work has centred on the native wildflower project and a private individual's native tree nursery, in the absence of true endemic species. A wildflower seed nursery and plantlet production system has been developed by the project officer, who works for a broad partnership of government departments and voluntary bodies (including the Farmer's Union and the Department of Transport). This was set up by the Department of Tourism.

Alien species legislation and control.
A number of known invasive species are listed in the Manx legislation including two seaweeds. This list is being revised as new threats have become apparent, particularly aquatics such as New Zealand Pigmyweed *Crassula helmsii*. We collect site records of these species to assess the scale of the alien species problem and have mapped this to help justify the bids for resources to control the species. For Japanese Knotweed (pictured) we have published a leaflet on identification and control.

Ultimately the legislation is there to prosecute, as well as providing publicity for the problem species. The law states that "if any person plants or otherwise causes to grow in the wild" the plant species in question or "releases or allows to escape into the wild any animal of a kind which is not ordinarily resident in and is not a regular visitor to the Island in a wild state" they are committing an offence. Active control by government of the natural spread of a species such as Japanese Knotweed is going to be required along certain river banks on the island. We have already taken steps to control the introduced fox although we are attempting this when the population is still very small, very few are sighted and we are often unable to rely on the sighting information given to us (the last "fox" turned out to be a rooster). On returning from the conference the body of a fox killed on the road was brought to the office, proving foxes are alive and well in the Manx countryside, a fact which had been questioned when our hired marksman and the Game Conservancy Trust's two-week survey in 1999 failed to find a single one.

Building partnerships

On the premise that government cannot and should not be the only one acting for wildlife and conservation, partnerships with others are essential. Partners effectively multiply the level of success and degree of consensus within the population. There is specific budget allocation for partnership support and a small grants scheme for projects.

Other government departments
A considerable amount of time has been spent working with other departments. Work varies from looking at potential waste disposal sites with least ecological impact to contributing to the Marine Pollution Contingency Plan. We work with the Planning Office on impact of proposed developments and the draft local planning documents. Developers and land purchasers now ask about wildlife constraints at a very early stage in discussions about a new development or even a speculative land purchase. The legislation requires "a department, statutory board or local authority, so far as may be consistent with the proper discharge of their statutory functions, to have regard for the conservation and enhancement of the natural beauty and amenity of the countryside, the protection of wildlife habitat, and the conservation of flora and fauna and geological or physiographical features of interest."

We work with the Manx Museum and National Trust (a government agency) who own and manage areas such as the Calf on which there is a bird observatory (picture below).

Voluntary groups
The Manx government works closely with the Manx Wildlife Trust through entering a management agreement with them on the conservation of a reserve in which corncrakes have nested and wild orchids occur in abundance. The Trust also acts as employer of the Ayres warden and for other temporary posts. A strong partnership exists between the Manx Bird Atlas and the office providing site by site bird reports and status reports on birds. Currently the Atlas staff are monitoring the effectiveness of the Agri-environment scheme. The Manx Bat Group assists with surveys of bat roosts especially where more eyes are required to surround a building at dusk as the bats leave. More recently the RSPB Northern Ireland office have been very supportive of chough conservation efforts, co-funding the Chough PhD study (see Research Bodies and universities below).

Private companies
During the last 5 years a good working relationship has developed between the conservation office and several companies, particularly the limestone quarry and the aggregates quarry. Both have disused holes. The old limestone quarry is a bee orchid site and a management plan has been developed for it. The worked-out gravel pit is now visited and colonized by a great variety of water birds and has been designated an Area of Special Protection for Birds (which used to be called a Bird Sanctuary). Memoranda of Understanding based on the Scottish model are the tool for cementing these partnerships.

Media
To ensure frequent and accurate reporting of progress and events we have developed good links with newspapers and radio. Remembering to report the positive helps to counter the inevitable less favourable coverage all government departments suffer from.

Land owner and farmer groups
The Farmers' Union and local Farming and Wildlife Advisory Group are always interested to see which government conservation schemes will affect them so we give talks and write for newsletters. Six individual landowners are now signed up to voluntary management agreements for rare species.

Research bodies and universities
The island is fortunate in having Port Erin Marine Laboratory (University of Liverpool) based here. They are acting as the supervisors for a Chough research PhD student and they undertake marine surveys for us. Postgraduate students from University College London Conservation Course have undertaken projects both on Mann and Jersey.

UK Authorities
Recently most contact has been with Defra (UK Department of Environment, Food and Rural Affairs). They are coordinating a regional sea initiative and we work with them on meeting international convention requirements. Ultimately they can be very useful in raising the profile of conservation in Overseas Territories or Crown Dependencies with other parts of government, local or UK. The Joint Nature Conservation Committee and country conservation agencies also provide valuable assistance.

Summary

Gradually the Isle of Man is bringing together and strengthening the strands of the conservation rope. In common with many Overseas Territories, we have a beautiful island, relatively few naturalists and conservationists, relatively few resources (compared with the UK for example) and a certain amount of pressure to develop (if not as strong as in Bermuda).

Our strategy is to build up our pool of skilled conservationists and naturalists both within and outside government, in order to work towards the sustainable use of species, habitats, both on land and in water, and the conservation of biodiversity, in protected areas and outside in the wider countryside. The next milestone has to be signing up to the Convention on Biological Diversity.

The UK Government's commitment to the Environment Charter process in the UK Overseas Territories

Valerie Caton, Head of Environment Policy Dept, UK Foreign & Commonwealth Office; with Roy Osborne, Deputy Head, Overseas Territories Dept, FCO; Denise Dudgeon, EPD, FCO; and Joelene Foster, OTD, FCO

Caton, V. 2003. The UK Government's commitment to the Environment Charter process in the UK Overseas Territories. pp 59-76 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

This presentation reviews progress on implementation of the Environment Charters since their signing in September 2001. It also gives a read-out of the UK government's priorities for the coming year, as agreed at the February meeting of the Whitehall Group on UKOT Environment Charters. The presentation provides an opportunity to explore strategies for strengthening stakeholder participation in, and implementation of, the Environment Charters. It explains the various funding avenues available to the UKOTs for environmental projects, and gives a progress report on the current FCO Environment Fund bidding round.

V**alerie Caton** (Head of Environment Policy Dept), with **Roy Osborne** (Deputy Head, Overseas Territories Dept), **Denise Dudgeon** (EPD), and **Joelene Foster** (OTD), Foreign & Commonwealth Office, King Charles Street, London SW1A 2AH, UK. Valerie.caton@fco.gov.uk

We are pleased that FCO has been able to contribute £70,000 towards this conference.

Our aim in this talk is briefly to cover three areas and then take questions:

1. Where have we got to so far in implementing the environment charters?
2. What are the UK government's priorities for the charters in the coming year?
3. What funds are available to the UK overseas territories for environmental projects?

The UK remains fully committed to taking forward the environment charter process, as the FCO Minister Bill Rammell made clear in a press release just before this conference. He said "The UK has a

L to R: Valerie Caton, joint chairpersons, Roy Osborne and Denise Dudgeon

rich natural heritage in the environment of the Overseas Territories. We must not squander this. We have a shared vision with the OTs to implement sustainable management practices". I see this conference as an opportunity to articulate that shared vision and help make it a reality.

Within the FCO, responsibility for the environment charters is shared between Environment Policy Department (EPD) in the Global Issues Command and Overseas Territories Department (OTD) in Americas Command. EPD lead on charter strategy; OTD on individual environmental issues. But of course to be successful we in FCO need to draw on the expertise of other Government departments, especially Defra (Department of Environment, Food & Rural Affairs) and DFID (Dpartment for International Development), and of NGOs, notably the UK Overseas Territories Conservation Forum. That is why, as of this year, we have established a new steering group in London, meeting three times a year under EPD's chairmanship, in January, June and September to give new impulsion to implementing the charters. The meetings in January and June are timed ahead of our joint meeting with the UK Overseas Territories Conservation Forum and designed to ensure that we coordinate our efforts better and have some well thought through ideas to discuss with the Forum.

Where have we got to so far in implementing the environment charters?

The first meeting earlier this year reviewed progress so far in implementing the Charters and discussed priorities for the coming year as we saw them.

Review of progress on implementation of the Charters since their signing
This is summarised in the two tables we have circulated (appended), which show progress by the UKOTs and HMG to date. It is essential that the UKOTs maintain close contact with us on their implementation of the Charters, and on the assistance they need, so that HMG can more effectively implement its own Charter commitments. It is also vital that UKOTs monitor and evaluate projects and let us know about their successful completion. This helps us demonstrate the value of our funding.

One of HMG's main input into Charter process has been the funding of two pilot projects: in Falkland Islands and TCI. Both have the same broad aim of developing a strategy for implementing Charter, but each takes a different approach. The methods used by both projects will eventually be assessed independently, with idea of using either or both as models for use in other UKOTs.

We will all face challenges in taking forward the Environment Charter process. One example of this is the proposal of the government of the Turks and Caicos Islands to introduce large scale cruise ship tourism into Grand Turk.

What are the UK government's priorities for the charters in the coming year?

I list below the UK government's priorities for the coming year, as agreed at the February meeting of the Whitehall Group on UKOT Environment Charters. We welcome your input/views on these priorities. HMG's priorities are:

1. UKOT legislative review
CITES legislation: In 1998/99, the CITES Secretariat assessed CITES implementing legislation in the UKOTs. This assessment identified that CITES legislation in Pitcairn, St Helena and Dependencies [Ascension and Tristan da Cunha], and South Georgia and the South Sandwich Islands (SGSSI), was insufficient. The UK has been instructed to submit a CITES Legislation Plan to the Secretariat by 31 March 2003 in respect of those three UKOTs. This work is now in hand. The Governor of Pitcairn has written to the CITES Secretariat outlining the powers that exist and he is awaiting comments and advise from them. St Helena has drafted new Ordinance to give effect to CITES and a similar review process is being undertaken in South Georgia and the South Sandwich Islands.

Convention on Biological Diversity (CBD): Work is ongoing in Bermuda and the Falkland Islands, and with FCO Legal Advisers, to put appropriate legislation in place in order to enable extension of CBD. Currently we hope extension to both UKOTs will be achieved during 2003. We hope then to identify one or two more UKOTs for CBD extension.

SPAW (Specially Protected Areas of Wildlife) Protocol to Cartagena Convention: the Cayman Islands are close to enabling UK ratification. We hope to identify other Caribbean UKOTs for extension of this Protocol.

Aarhus Convention: The Aarhus Convention came into force in 2001 and the UK is aiming to

ratify later this year. It champions public access to environmental information, public participation in environmental decision-making and access to justice. We are keen to provide assistance to UKOTs on the practical implications of this Convention. Defra has wide expertise for you to tap into and has published guidance handbooks on participation and access to justice.

2. Post-WSSD partnerships in UKOTs

UK Sustainable Tourism Initiative: The goal of the STI is to introduce sustainable tourism practice into the UK outbound tourist industry. This takes 20 million visitors every year to 150 countries where they spend £9bn. In essence the STI seeks to ensure that this expenditure leads to sustainable development of the destinations they visit. There are 40 partners including tour companies, NGOs and Government. An action programme has been agreed. A multi–stakeholder Foundation, under the chairmanship of Derek Stevens, a former finance director of British Airways, has been established to implement the programme. Initial funding is in place and it is hoped to grow this over time. There is a possibility for the STI Foundation to undertake a project with one of the UKOTs. Come and talk to me if you are interested.

Caribbean oceans initiative, White Water to Blue Water: (2-page handout included in delegates' packs). We are giving active support to WW2BW, notably through EPD's provision of £65,000 for a Caribbean workshop focusing on land-based sources of pollution and sustainable tourism. We would like to bring together the STI and the Land Based Sources of Pollution Protocol to the Cartagena Convention in a workshop looking into the impact of tourism on island infrastructure. This is with the aim of finding ways of establishing co-operation between the tourist industry and local public and private stakeholders to minimise pollution and protect the natural environment. We are still at the planning stage for this workshop, which is likely to take place late this year or early next. We would welcome your suggestions on content, format and venue.

What funds are available to the OTs for environment projects?

Funding avenues available to UKOTs for environmental projects:

FCO Environment Fund:

FCO's funding arrangements for environment projects have been undergoing considerable change last year and this. The aim is to avoid a watering-can approach to project work, and to improve how we administer the funds. Some were worried that the FCO's decision last year to combine the fund for UKOTs with other funds into a single Environment Fund might result in the UKOTs losing out in this year's bidding round. The final decision on allocation of funds will be taken this week but the strong likelihood is that the UKOTs will in fact attract more than the half million pounds previously allocated to the UKOTs Environment Fund. This is due to the high quality bids we have received this year from the UKOTs, which have competed well against other bids.

As of this year, the FCO's environment fund has become part of the much bigger Global Opportunities Fund (GOF). It comes under a strand of the GOF for energy and environment programmes. Funding for this strand is expected to be 2003-04 £5m, 2004-05 £8m, and 2005-06 £13m. Again the FCO's aim will be to avoid a watering-can approach, instead focusing effort on what Ministers see as the UK's global priorities. What those priorities will be and how the new fund will be administered are currently still under discussion with Ministers. A sizeable portion of the new money is likely to go towards climate-related renewable energy and energy efficiency projects. Another priority will be promoting democracy and good governance, including better public access to information, public participation in decision-making and better public access to justice. This fund should therefore offer new funding opportunities for good projects from the UKOTs, which are targeted to further these aims but we need you to think imaginatively when putting your bids together, to ensure that they fit well with the fund's objectives. Of course, funding for current projects under what was the Environment Fund for Overseas Territories will continue as well.

DFID's new Global Environment Programme fund:

A sum of £200,000 has been committed for 2003/04, with further commitments over 5 years expected to total £1million. Project details are currently being developed with DFID OTD's incoming Environment and Natural Resources Adviser, Dick Beales, who starts work in London on 1 April 2003. A document outlining the key objectives of the project will be sent to those Territories with which DFID works for consultation shortly after Mr Beales takes up his post. The

programme will be designed to ensure complementarity with FCO funds, and it is anticipated that the two departments will work closely together on these issues.

On **Defra's Darwin Initiative**, we are very pleased to hear that two UKOT applications have been successful. They are for Tristan da Cunha (Empowering the people of Tristan da Cunha to implement the CBD) and for British Virgin Islands (Assessment of the Coastal Biodiversity of Anegada). Defra will be making the official announcement today (Monday 24 March 2003).

The UK remains as committed as ever to supporting and funding the Environment Charter process. We look to you in future to find new ways and newer and even better projects for taking this process forward.

Appendix 1: HMG Commitments and Progress to date

Please note that these lists are working drafts, and do not yet include reference to the contributions of DFID or the UK Overseas Territories Conservation Forum and other NGOs. The lists are being developed further to reflect those contributions.

	HMG Commitment	Progress	Timing
1	Help build capacity to support and implement integrated environmental management which is consistent with the OTs'own plans for sustainable development	• Developing Henderson Island Management Plan including use of FCO funds (FCO) • Developing Chagos Conservation Management Plan (CCMP) for BIOT (FCO) • Applied to UNESCO to have Gough Island World Heritage Status extended to include Inaccessible Island (FCO and DCMS) • Various consultation exercises with OTs requesting details of environmental priorities/assistance required (FCO) • FCO funded feasibility study into Barker's Park – to establish first of a network of national parks in Cayman Islands (FCO) • FCO funding two Environment Charter pilot projects – in Turks & Caicos and Falklands Islands. JNCC to independently assess both projects in due course with a view to one or both models being used eventually in other OTs. • Whitehall Group on OT Environment Charters formed in 2003 to secure co-ordinated Whitehall approach to Charter implementation. In particular, the Group aims to maximise HMG's funding resources to achieve implementation of Charters and MEAs. Guidelines and priorities for 3-year period up to and including FY 2005/06 will be set.	Ongoing since Sept 01 Ongoing since Sept 01 Application submitted in Dec 02 Ongoing FY 2001/02 FYs 2002-2005 2003 and ongoing
2	Assist the OTs in reviewing and updating environmental legislation	• List of spreadsheets giving details of MEAs distributed to OTs (FCO) • Provided expert advice (including legal) to Cayman Islands on draft National Conservation Legislation including for SPAW Protocol, and on CITES legislation. New CITES Endangered Species law due to go before Legislative Assembly soon (FCO and JNCC) • FCO-funded project to update National Parks legislation in BVI. Supplied draft model legislation from other OTs and offered legal advice. (FCO) • Advice given to Pitcairn, SGSSI and ST Helena and Dependencies on updating their legislation to meet the requirements of CITES (FCO)	August 2002 Ongoing since Sept 01 FY 2002/03 Ongoing since Sept 01

3	Facilitate the extension of the UK's ratification of MEAs of benefit to the OTs and which they have the capacity to implement	• Legal advice to Cayman Islands govt on effect of SPAW ratification on Cayman Turtle Farm (FCO and JNCC) • Legal advice given to Anguilla and Turks and Caicos in extension of UK ratification of CITES and SPAW Protocol (FCO) • Advice given to BAT on extension of CMS, ACAP (FCO and JNCC) • Advice given to SGSSI, Falkland Islands and Tristan da Cunha on extension of ACAP (FCO and JNCC). • FCO signed the MOU on Indian Ocean Turtles on behalf of UK on 25 March 2002, on the basis that it is a non-binding instrument reflecting common understanding between the signatories and does not impose any legally binding obligations (FCO and Defra. JNCC scientific support to IOT MOU meeting) • Discussions held with Defra, JNCC and Ascension Island about possible UK signature of Atlantic Ocean Turtle MOU (FCO and DEFRA. JNCC scientific support to Nairobi AOT MOU meeting) • Extension of CITES to BIOT (FCO and Defra. JNCC appointed as scientific authority (fauna). CITES legislation was enacted and has been in force since December 2001. • Ongoing liaison to support Bermuda and Falkland Islands with preparations for extension of CBD following work done on legislation in mid-2001. (FCO) • Ramsar designation for Great Chagos Bank (BIOT) being pursued (FCO and Defra) • Cross-Whitehall discussions on the implications and feasibility of the extension of the Aarhus Convention to the Overseas Territories, Cyprus SBAs and Crown Dependencies	Ongoing since Sept 01 Ongoing since Sept 01 Ongoing since Sept 01 Ongoing since Sept 01 Ongoing since Sept 01, March 02 Ongoing since Sept 01 Ongoing since Sept 01 Ongoing since Sept 01 January 02 onwards FY 2002/03
4	Keep the OTs informed regarding new developments in relevant MEAs and invite OTs to participate where appropriate in the UK's delegation to international environmental negotiations and conferences	• EFOT funded St Helena govt representative to attend CBD, The Hague, April 2002 (FCO) • EFOT funded OT participation at Hawksbill turtle conference, Cayman Islands, May 2002. JNCC, Defra and FCO held various discussions with the OTs during that meeting and have continued to advise since then. JNCC provided brief of Hawksbills for OT comment. • FCO funded participation of Michelle Fulford-Gardiner in International Whaling Commission, May 2002 (FCO) • Facilitated participation by Caribbean OTs at Cartagena Convention (FCO) • UK delegation attended Cartagena Convention (FCO, scientific support from JNCC) • Keep OTs informed of CITES prior to November 02 COP 12 and arrange for their comments to be considered prior to UK's decision on proposals. (FCO and Defra) • Look at how best to establish a "virtual forum" to give advice to the OT CITES Management and Scientific Authorities (FCO and Defra. JNCC provided advice and engaged consultant to provide technical project proposal that meets the needs of users) • Advice on application for CITES registration by Cayman Turtle Farm (FCO and Defra. JNCC made significant input to the proposal, its evaluation and presentation) Follow-up instructions sought from Cayman Islands in Jan 03 • OTs invited to join the UK delegation to Ramsar COP8 in November 2002 (FCO) • OT contributions included in UK National Ramsar Report to COP8 (FCO, Defra, JNCC) • Contribution to Ramsar site review (JNCC) • World Summit on Sustainable Development (WSSD) Johannesburg: Bermuda's Environment Minister and Perm Sec on UK delegation	April 2002 Ongoing since Jan 02. May 2002. May 2002 May 2002 Ongoing in 2002 Ongoing since 2002 Ongoing since Sept 01 2002 Sept/Oct 2002 FY 2002/03 Sept 02

5	Help ensure the OTs have the legislation, institutional capacity and mechanisms it needs to meet international obligations	• FCO funded CITES customs training workshop for Caribbean OTs planned for July 2003 (FCO) • FCO-funded workshop on sustainable tourism/land based sources of pollution for Caribbean OTs/Bermuda, and independent Caribbean states, planned for late 2003/early 2004 (FCO) • Provided guidance to all OTs on requirements for Environmental Impact Assessments	July 2003 Late 2003/early 2004 January 2003
6	Promote better cooperation and the sharing of experience and expertise between the OTs and small island states and communities which face similar environmental problems	• FCO co-funded third OT Environment Conference in Bermuda (March 2003) (FCO) • FCO supported the Defra-funded 3-year project Turtles in the Caribbean Overseas Territories (FCO) • Exploratory contact made with New Zealand funded Co-operative Islands Initiative on Invasive Alien Species and existence of initiative flagged up in CBD COP6 telegram. Potential for future co-operation but none recorded as yet (Defra, FCO)	FYs 2002, 2003 FYs 2002-05 FY 2002/03
7	Use UK, regional and local expertise to give advice and improve knowledge of technical and scientific issues. This includes regular consultation with interested NGOs and networks.	• Provided advice for use of devolved funds and for developing project bids to new Environment Fund (FCO) • Offered technical expertise through visits to OTs, and through panel of experts for EFOT funding applications (FCO) • JNCC continue to provide technical support for the Seabirds at Sea project around the Falkland Islands (and also South Georgia) and sit on the project steering group (JNCC) • JNCC published *"Biodiversity: the UK Overseas Territories"* as a contribution to the Environment Charter process (JNCC) • JNCC part-funding PhD study into effects of climate change on UK OTs (JNCC)	Ongoing since April 02 Ongoing since 2002 Ongoing since 1999 1999 Study started 2000
8	Use the existing EFOT and promote access to other sources of public funding for projects of lasting benefit to the OTs' environment	• EFOT now merged into FCO's Environment Fund/Global Opportunities Fund. £500,000 secured from GOF for OT environmental projects up to and including FY 2005/06. • DFID Global Environment Programme Fund (OT-GEP) to come on line in FY 2003/04. FCO and DFID working together to harmonise funds and maximise their impact. • Many projects funded from EFOT – all linked in closely with HMG and OT Environment Charter commitments (FCO) • EFOT supported Cayman Islands 'Under the Waves' educational project which received several awards including a 2002 US Telly Award for Excellence in Children's Programming (FCO)	FY 2003/04 up to and including FY 2005/06 FY 2003/04 onwards Ongoing since Sept 01 FY 2001/02
9	Help the OTs identify further funding partners for environmental projects, such as donors, the private sector or NGOs	• Liaison within HMG (FCO) • Secured publicity for projects including on FCO website/homepage. Press articles and Ministerial statements delivered on launch of South Georgia website, on TCOT project, and on Bermuda Conference (FCO) • Explore access to EU funds for OTs (FCO)	Ongoing since Sept 01 Ongoing since April 02 Ongoing in 2002
10	Recognise the diversity of the challenges facing OTs in very different socio-economic and geographical situations	• An overriding aim when dealing with OTs. For instance, despite pressure from UNESCO, we are taking the time needed to consult the Pitcairn Islanders fully on a World Heritage Site Management Plan for Henderson Island. Drs Mike Brooke and Rosie Trevelyan visited Pitcairn Feb/March 2003 to take forward the Plan. (FCO)	Ongoing since Sept 01
11	Abide by the principles set out in the Rio Declaration on Environment and Development and work towards meeting International Development Targets on the environment	• Through activities listed above and planned for the future (FCO)	Ongoing since Sept 01

Appendix 2: Overseas Territories Commitments and Progress to date, plus Requests for Assistance

Please note that these lists are working drafts, and do not yet include reference to the contributions of DFID or the UK Overseas Territories Conservation Forum and other NGOs. The lists are being developed further to reflect those contributions.

Overseas Territory	Progress	Requests for assistance from HMG	Action:
Anguilla	Charter is being linked with the OECS St George's Declaration for which a National Environmental Management Strategy and Action Plan is being formulated with the help of the OECS Natural Resources Management Unit (NRMU). The government is committed to environmental protection and conservation as a key strategy for sustainable development. This has included a new policy on Biodiversity, a draft policy on National Wetlands, a draft ordinance on National Parks and Protected areas, and the declaration of a number of marine and terrestrial protected areas/parks. Anguilla lacks adequate financial and technical resources and there are limited numbers of people/expertise with which to take forward all the initiatives contained in the OT Charter. Furthermore, there is neither an environmental department nor director of environment and no focal point to draw together all the relevant parties. The main activities for future implementation include the establishment of a suitable management structure for the proposed National Parks and Protected Areas System using the TCI model, the development of a National History Museum and also the development of a Heritage Tourism Programme by the Anguilla Trust in association with the RSPB and the implementation of the National Environment Management Strategy (NEMS). We have not yet had sight of a strategy for action, as mentioned in OT Commitment No 1 of the Environment Charters.	Technical assistance to recruit the first Protected Areas Manager (PAM) who would also provide in-service training for an understudy. Technical assistance for the recruitment of a Multi-lateral Environment Advisor to guide extension and initiate implementation of SPAW Protocol, CBD, CMS and CITES. Funding for some activities for the implementation of NEMS. A medium term relationship with another environmental NGO which can commit resources could establish a base for sustainable environmental management (eg, RSPB have been working with the Anguilla National Trust on a tourism-supported environmental project and they could do a lot more). Seven project bids submitted to FCO for FY 2003/04: (1) Eco-tourism in Anguilla; (2) Establishment of a First Class Interpretation Centre for East End Pond Conservation Area; (3) Development of the Anguilla National Museum; (4) A publication: A Guide to the Flora of Anguilla; (5) Security of a Potential World Heritage Site: The Fountain Cavern; (6) Establishment of the Anguilla National Parks Service; and (7) Survey, Mapping and Research of Anguilla's Marine Resources. Four bids rejected. Two bids successful: (1) Eco-tourism in Anguilla; (2) A Publication: A Guide to the Flora of Anguilla	**OTD** **OTD** **OTD** **OTD**

Ascension Island	An informal cross-sectoral environmental forum in the form of the Ascension Heritage Society (AHS) exists. However, for the purposes of formulating an environmental action plan, an entity independent of the AHS will be formalised by the new government. The Ascension Island Management Plan (AIMP) focuses on many of the commitments of the Charter and Ascension are at a stage of implementing many of these commitments. Some of the Environmental Charter commitments are not included in the AIMP and it will be the responsibility of the new cross-sectoral forum to discuss and develop these areas. Five ordinances exist in relation to protection of species and habitats. A new ordinance, the Ascension National Protected Areas Bill, is in draft format and is hoped to be enacted by the end of 2002, with management plans, in early 2003. It will allow for the development of marine and terrestrial protected areas. Environmental awareness is actively promoted through the local media and by production and distribution of several publications, leaflets, a video and the creation and development of a conservation visitors centre. A review of baseline data was completed during the creation of the AIMP and work is in progress to collate supplementary data where gaps were identified. Further efforts are required in partnership with St Helena Government in respect of the collation of marine baseline data. Monitoring and enforcement mechanisms are required together with a review of existing legislation and new legislation created to uphold the principle that the polluter should pay. RSPB are conducting an FCO-funded seabird restoration project on Ascension Island. They are also looking into rat control. They do not recommend a rat eradication exercise at this stage due to the complexity of the exercise, the uncertainty of a complete eradication and the cost (estimated at £2 million). RSPB have completed some further research and a report is due for issue shortly. This should advise local authorities of an affordable, effective strategy to keep the rat population down to manageable levels. We have not yet had sight of a strategy for action, as mentioned in OT Commitment No 1 of the Environment Charters.	Two project bids submitted to FCO for FY 2003/04: (1) Ascension Island Marine Turtles; and (2) Ascension Turtles Follow-on Project. One bid successful: Ascension Island Marine Turtles	

Bermuda	An Environmental Forum was established in 2002. It includes representatives of all the principal environmental organisations, individual champions and four representatives from different sections of the Ministry of the Environment. In April 02 the Ministry of the Environment was reorganised following a review. Responsibilities, resources and programmes were reallocated to the new Department of Environmental Protection or the Department of Conservation. It is hoped this reorganisation will enable Bermuda to better meet its environmental commitments. Following a review of Bermuda's legislation and policies in May 2001, action has been taken to address those areas that fail to comply with the provisions of the CBD. These include development of policies regarding access to genetic resources, amending the Parks Act to extend into the marine environment, and creating a Protected Species Act. Bermuda's Biodiversity Strategy and Action Plan was tabled in the House of Assembly in March 2003. This followed an ambitious public education and engagement campaign spanning 2001-2002 which facilitated wider community input into the development of policy options. This project was funded by the Darwin Initiative. The Minister of the Environment declared 2001 as the year of "Biodiversity Awareness" and 2002 as the year of "Biodiversity Action". The focus is to encourage a co-ordinated, community based plan of action to conserve the Islands biological diversity. All of Bermuda's schools were involved in the second Environmental Youth Conference May 02. As part of the development of a BSAP for Bermuda, the Darwin Initiative sponsored a week-long invasive species workshop aimed at the development of a co-ordinated strategy for the prevention, control and eradication of invasive plants and animals. Funding has been secured for an applied ecologist to co-ordinate the review of environmental impact statements for all major developments. Bermuda's first "State of the Environment Report" is expected to be published before the end of 2003. It will provide an up-to-date report on the state of the environment, establish benchmarks for monitoring change and progress, and will serve as an excellent resource for assessing future policy initiatives. Under the Bermuda Biodiversity Project work continues on the collation of biodiversity and natural resource data into a relational database with a GIS interface. The Department of Education has worked closely with the Bermuda Zoological Society to promote environmental education in the schools. The curriculum for primary and middle school levels have incorporated modules on Bermuda's natural history.	Attendance at the WSSD Technical assistance to prepare an inventory of greenhouse gas emissions pursuant to the Kyoto Protocol. Technical assistance in the development of a sustainable energy plan. The plan is in the early stages of development. Technical advice regarding progress towards satisfying the requirements of the CBD Assistance in training senior colleagues on the importance of integrating environmental considerations in the development of government-wide policy. Requested guidance on furniture recycling scheme. Assistance is being sought from the London Community Recycling Network. Assistance to identify a UK expert on sustainable development in SIDS. One project bid submitted to FCO for FY 2003/04 and was successful: Amphibian deformity and links to marine pollution. Assistance in the development of policies and/or legislation for the controlled access to genetic resources Draft TOR for a study being considered by the Government of Bermuda	**Iain Orr, EPD, arranged. Minister and Perm Sec attended** **James Burt, Defra** **Meg Patel, EPD FCO, awaiting advice from Governor's office** **Denise Dudgeon, EPD, FCO** **Carl Malin, OTD. No specific approaches yet from Bermuda.** **Carl Malin, OTD, secured advice from London Community Recycling Network and passed details to Bermuda.** **Carl Malin, OTD, passed details to Bermuda** **Denise Dudgeon, EPD, FCO** **Carl Malin, OTD**

	On stockpiled asbestos, Bermuda has been asked to identify technical assistance required to identify asbestos disposal options. A summary of the BSAP, which fits with OT Charter Commitment No 1 (a strategy for action), was presented at the Bermuda conference.		
BIOT	The draft Chagos Conservation Management Plan (CCMP) is with the BIOT administration for comments. The completed version is likely to be published in Spring 2003. Wider Ramsar designation was suspended pending the outcome of the feasibility study into possible resettlement of the outer islands of the Chagos Archipelago. Although the feasibility study itself has been completed, no final decision on its implications has yet been made. In the meantime, the BIOT Administration have been exploring the idea of Ramsar designation for part of the Great Chagos Bank. We await the completion of the update to the US Natural Resources Management Plan for Diego Garcia. CITES legislation was enacted for BIOT on 21 December 2001 extending the convention to BIOT. UK signature of MOU on Indian Ocean Turtles March 2002.		
British Virgin Islands	OT Charter commitment 1: The National Integrated Development Strategy (NIDS) planning process took place during 1996-99. All Govt depts, the private sector and the community were involved in the development and review of this strategic 5-year plan. NIDS outlines the vision for BVI and sets out the main strategies, policy agenda and administrative framework needed. The BVI Govt adopted NIDS in 2002. The present plan guides 2002-2006. OT Charter commitment 2: The most recent legislation which offers protection to marine habitat is the BVI Fisheries Act (2000). Since 2001, the BVI has been working on the regulations for the act. They are presently in final draft stage and should be passed by second quarter of 2003. There is existing Parks and Conservation Legislation, but these are greatly outdated and need revision. The National Parks Trust has been successful in securing FCO funding to have parks and protected areas legislation reviewed and updated.	A project bid to Defra's Darwin Initiative on "Assessment of the Coastal Biodiversity of Anegada" was successful (results announced March 2003) Seven project bids submitted to FCO for FY 2003/04: (1) Environmental Action Plan/Environmental Code; (2) Drafting regulations for National Parks; (3) Eradication of invasives re Iguanas; (4) Mangrove Interpretative Centre; (5) Island erosion website; (6) Island restoration for Magnificant Frigatebird; and (7) Raising Environmental Awareness and Education. Six rejected. One bid successful : (1) Environmental Action Plan/Environmental Code.	

	The Conservation and Fisheries Dept (CFD) has secured FCO funding to develop an Environmental Action Plan/ Environment Code. This should entail comprehensive reviewing, updating and revising of the rest of the Territory's environmental legislation. This is necessary for CFD as well as NPT to function since new parks legislation will be extremely limited in effectiveness if comprehensive environmental legislation is not enacted. CFD has sought funds from BVI Govt for 2 years but this has been rejected. OT Charter commitment 3: Provision for inclusion of environmental concerns into social and economic planning is made in NIDS but this still requires more effort to implement in practice In the Fisheries Management sector, the Govt has entered into co-management ventures with fishermen who collaborate on the identification of closed seasons, etc. OT Charter commitment 4: EIA is presently an administrative requirement by BVI Govt for all development projects/applications that go through the normal channels. EIA needs to be legally formalised in order to ensure all major projects undergo – Environment Code necessary. OT Charter commitment 5: It is the Land Development Control Authority's policy to require public notice in the newspapers about major projects. In some cases the public has demanded meetings on certain developments. Again, public participation needs to be legally formalised and enforced – requires development of an Environment Code. OT Charter commitment 6: Again development of an Environment Code necessary. Local enabling legislation needs to be passed in many cases. OT Charter commitment 7: Since 2000, the Complete Resource Information System (CRIS) has been developed which allows users to view all GIS data available in the BVI on a simple to use computer interface. It compiles all critical environmental indicators and has assisted in making inventory of current data (fully documented with metadata) and can be used to identify data gaps. Coastal Resources inventory is an ongoing project for 2003. Darwin Initiative project on "Assessment of the Coastal Biodiversity of Anegada" has been successful and will evaluate extent and special nature of Anegada's environment.		

	OT Charter commitment 8: There is existing Fisheries Legislation (2000) which makes provision for persons to pay penalty for contaminating the marine environment with oil. Need for wider legislation through development of environment code. Working through NPT legislation project to restructure surveillance unit and training. Regulations passed in 2002 for the derelict motor vehicle act (2000) make provision for automobile owners to pay a fee for the eventual disposal of their vehicles at end-of-life. OT Charter commitment 9: Environmental Education Unit coordinates summer programme in conjunction with NPT. Also participate in annual schools science fair and creates displays for various events (Agricultural fair, Tourism Month, GIS Day, regional and international meetings) CFD is aiming to put all public information available on a website. Several hundred thousand dollars have been invested in the website's development. However funds are needed to complete and launch the website. BVI Solid Waste Department piloted a 'green school' environmental competition during 2002. The programme will be expanded to other schools in 2003. OT Charter commitment 10: CFD and NPT both publish newsletters. CFD submits several articles to local papers. In addition, CFD conducts month-long awareness raising during environment month activities every June. Funds are needed to complete CFD website and a CD Atlas. The BVI Solid Waste Dept also publishes a quarterly educational newsletter on keeping the environment clean A Farmer's magazine has recently been launched CFD hosted/participated in radio programmes promoting departmental projects on Red Hind, Fisheries Management, Fisheries Regulations and other environmental issues. OT Charter Commitment 11: The BVI has a national strategy – NIDS – there are also national sustainability commitments under St Georges Declaration, as well as UKOT Environment Charter. CFD has made progress in this area by designing a research strategy that identifies which areas of work need new research, and how individual projects may feed these, and an environmental action plan project. The basis for the Research Strategy is the agreements BVI has committed to (Rio Declaration, UKOTEC, SGD, MCAP, etc).		

Cayman Islands	On 27 August 2002 the Executive Council approved a National Environment Policy developed to address commitments made in the OT Charter and MEA (e.g. RAMSAR, CBD, SPAW etc) extended to the Cayman Islands by the UK. The policy outlines five broad goals and eight key strategies, with two of the agreed areas for priority being: - The enactment of the National Conservation Legislation; and - The establishment of a National System of Protected Areas, starting with the creation of the Barkers National Park. The National Conservation Legislation was redrafted in late 2002. It was hoped that the legislation would be passed in February 03 but this has slipped again to late 2003. Amongst other things, this should enable UK ratification of the SPAW Protocol. There are a number of recent and on-going public/private sector committees and focus groups that have and are working on a variety of environmental issues, the Dept of Environment has initially opted not to convene another forum to determine an Environment Charter strategy for action, but rather to concentrate on implementing existing recommendations. Examples of recent and on-going environmental forums include: - Vision 2008: the national strategic plan involving numerous strategy "round tables" consisting of public and private sector representatives – completed 1999. Two relevant strategies are Strategy 10 "*We will develop and implement a growth management plan to achieve and maintain a balance between the natural and built environment*" and Strategy 11 "*We will protect our natural environment, particularly the Central Mangrove and other wetlands, the North Sound and coral reefs, from further development*" - Wetlands Committee: report submitted November 2001 - 2002 Development Plan Review Committee's Special Issues Committee on Environment and Coastal Zone Management: report completed April 2002. Among other things, the report recommends the establishment of four new zones in the Development Plan: (a) The Conservation Zone; (b) Land for Acquisition Overlay Zone; (c) Special Planning Area Zone; (d) Nature Tourism Zone. - Ongoing Dept of Environment review of Marine Park system involving consultations and meetings with a number of stakeholder groups - Various stakeholder groups for the Aggregate Study conducted by CH2M Hill. - Recently established Beach Review and Assessment Committee that is comprised of public and private sector representatives and reports to the Ministry of Tourism, Environment, Development and Commerce. Terms of Reference for the Committee are available from EPD.	The Cayman Islands Dept of Environment have requested help from HMG in developing a sustainable tourism action plan. Three bids submitted to FCO for FY 2003/04 : (1) Design and Implementation of Barkers Park; (2) Improvements to Mastic Trail; (3) Parrot Jam Cooperative One bid successful: Improvements to Mastic Trail. Technical assistance to prepare an inventory of greenhouse gas emissions pursuant to the Kyoto Protocol.	**Roger Platt, EPD, awaiting feedback from Cayman Islands Dept of Environment** **Meghna Patel, EPD**

	All the above environmental initiatives involve public consultation and all relate to implementation of the Charter commitments.		
Falkland Islands	A cross-sectoral stakeholder forum has been established responsible for discussing environmental issues, strategy and policy. Falklands are well on track to fulfilling their Environment Charter commitments. A Falkland Island development plan to guide and facilitate sustainable development in the islands is planned for November 2004. This will ensure that commitments under the Rio Declaration on Environment and Development are met inside of the Rio timetable. Protection and restoration of key habitats, species and landscape features is ensured through implementation of 1999 legislation to designate National Nature Reserves under which 26 designations have been made. Furthermore, 1992 legislation prohibits the killing or taking of marine mammals on land or in internal waters, territorial seas or fishery waters of the Falkland Islands. Two RAMSAR sites have been designated and two sites currently being assessed for designation. Three further areas under consideration with a view to their designation as National Parks. An annual Environmental Studies Budget in the order of £130,000 supports research and active habitat management. A similar level of funding is given to Falkland Conservation. Environmental impact assessments can be requested at the behest of the Environmental Planning Officer under section 33 of the Planning Ordinance 1991. EIA requirements will be further consolidated by the Islands Plan 2002-05, which sets a task of preparing draft EIA regulations by 2003 and adopted regulations by 2004. This will assist the Falkland Islands to be a signatory to CBD. CITES, CMS, the London Convention and RAMSAR have all been extended to the Falkland Islands. The Falkland Islands Government support the UK ratification of ACAP. A working group is addressing extension of CBD to the Islands, which is expected to happen in 2003. The introduction of an environmental regulation system should ensure better management of waste in the Falkland Islands. The Islands plan tasks implementation for 2003/04. By 2003/04 a cross phase policy on environmental education will be in place operating in harmony with Falklands Conservation and its youth group. Environmental awareness is promoted by the media in the Falkland Islands through FIGO in London and through local press and radio stations.	Three project bids submitted to FCO for FY 2003/04: (1) Conservation of Threatened Flora; (2) Developing Environmental Education; and (3) Boat for Environmental project work. Two bids rejected One bid successful: Boat for Environmental project work. Bid submitted to Defra's Darwin Initiative on "Falklands Islands Invertebrates Conservation Project". Unsuccessful.	

	Further work is needed to identify gaps in research, to prepare outstanding management plans and to prioritise management action against available resources. The FCO funded Environment Charter pilot study, involving the recruitment of a Conservation Strategy Officer, will help to deliver on these aspects via a conservation strategy and biodiversity action plan. We expect the strategy for action, as mentioned in OT Commitment No 1 of the Environment Charters, to be produced as a result of the Conservation Strategy Officer post.		
Montserrat	Charter is being linked with the OECS St Georges Declaration on the Environment. In early 2002, Ministry of Agriculture, Housing, Land & Environment (MAHLE) planned to hold series of stakeholder meetings, following which the environmental strategy paper would be submitted to GoM Ministers at the Executive Council for approval. The main problem in taking the environment charter forward is lack of resources. GoM civil servants and Montserrat National Trust are severely stretched. An Environmental Educator/Co-ordinator is required to produce the strategy paper. MAHLE and MNT have been advised to submit project proposals to fund the recruitment. MNT is under new temporary management. Without external funding, it is very unlikely that the Government of Montserrat will make much progress on the Environment Charter We have not yet had sight of a strategy for action, as mentioned in OT Commitment No 1 of the Environment Charters.	Three project bids submitted to FCO for FY 2003/04 : (1) Developing Marine Park; (2) Rehabilitation of Carrs Bay Wetland; and (3) Soil & Biodiversity Conservation. None successful.	
Pitcairn	Progress in drafting an environmental strategy or forming a stakeholder group has been limited. We have not yet had sight of a strategy for action, as mentioned in OT Commitment No 1 of the Environment Charters. Progress should be made further to the March 2003 visit to Pitcairn of Drs Mike Brooke and Rosie Trevelyan (they will be discussing the draft Henderson Island Mangement Plan, and the Environment Charter process in general), and the arrival on Pitcairn of HMG's first representative, Jenny Lock (March 2003)	One project bid submitted to FCO for FY 2003/04 and was successful: Removal of Invasive Rose Apple and Restoration of Native Vegetation.	
South Georgia and South Sandwich Islands	The GSGSSI's Environmental Management Plan is due to be revised in the next 12 -18 months and this will set out the Government's plans for the following 5 years. It will also enable the Government to provide a report on the progress that it has made in implementing its current plan. The Government's Environmental Baseline Survey, a three-year project, has just been completed and the final report is awaited. This will enable decisions to be made on how to handle any impact that visiting tourists have on sensitive sites.	Two project bids submitted to FCO for FY 2003/04: (1) Grytviken asbestos removal; and (2) The Future of South Georgia Conference. One bid successful : The Future of South Georgia Conference.	

	There is progress on the clean-up of hazardous waste at the former whaling station at Grytviken. It is hoped that a partnership agreement with a Falkland Islands based contractor will enable the project to start this year.		
St Helena	OT Charter commitment 1: The cross-sector forum, named the Environmental Advisory Consultative Forum (EACF), responsible for implementing the Environment Charter was appointed in December last year. The EACF includes representation from the Sections/Departments of the St Helena Government responsible for the wide range of environment and conservation issues on St Helena, the island's business community, the National Trust and Legislative Council. The aim/objective of the EACF is to "provide a cross sectoral forum to facilitate the implementation of the Environment Charter leading to the formulation of an Environment and Conservation Strategy for St Helena and to advise on Environmental best practice." One of the first tasks of the EACF will be to formulate and agree on a strategy for action. OT Charter commitment 2: The St Helena Government adopted the Strategic Land Use Plan (SLUP) in 1993, which provides the framework for policy guidance on land use and development in St Helena up until 2002. The SLUP is now in the process of being revised and on completion will become the Land Development Control Plan in accordance with the Land Planning and Development Control Ordinance 1998. SLUP includes a Protected Areas policy, which designates conservation areas for the built and rural environments. Species Conservation for the endemic flowering species is a critical issue. Recently tremendous losses have occurred in both nursery stocks and in wild populations. A working group chaired by the Environmental Co-ordinator has been set up to determine a co-ordinated approach to addressing this problem. The Environment Conservation Section of the Agricultural and Natural Resources Department (ANRD) with support from the NGO, The St Helena Nature Conservation Group, are working towards expanding rehabilitation activities to save native habitats and endemic plant species and increase their populations. Current activities include establishing seed orchards and natural habitats, and drawing up Recovery Plans for all species.	Three project bids submitted to FCO for FY 2003/04: (1) Invertebrates survey on Prosperous Bay Plain; (2) Monitoring scheme for cetaceans; and (3) Control of Alien Species. Two bids successful : (1) Invertebrates survey on Prosperous Bay Plain; and (2) Monitoring scheme for cetaceans	

	OT Charter Commitments 3, 4, & 5: In many regards social and economic planning processes are currently in their infancy on St Helena. However where deemed appropriate environmental considerations are integrated through consultation with key environmental stakeholders. This is usually done through the project cycle where environmental concerns are investigated from the concept note stage. Environmental Screenings (following the DFID guidelines) are done for all major projects, including all projects that are funded through external development aid. A project to survey the endemic invertebrate fauna at the proposed airport site has secured FCO funding. The data derived from this project will be used as part of the ecological impact assessment for the EIA for the airport project. OT Charter commitment 6: St Helena is currently signed up to ten Multi-lateral Environmental Agreements (MEAs). Our implementation and compliance to some of these MEA's has noticeably increased in recent months. Of particular note is the passing of the Endangered Species Protection Ordinance 2003 late last year. This is our CITES Ordinance. The design and implementation of a monitoring project for Cetaceans is also underway, this will help us meet part of our obligations under the Convention on Migratory Species. A project in relation to this has secured FCO funding. OT Charter commitment 7: One of the main shortfalls of the environment sector is the provision of environmental baseline data. A project to establish baseline data in St Helena's flora and fauna, in particular endemic invertebrate species, rare ferns, lower plant species and marine flora and fauna has been preliminary drafted and will be developed as a matter of priority. OT Charter commitment 9: Schools on the island continue to work towards the implementation of local environmental issues cross-curricular, to raise awareness and appreciation of our local environment. The Fisheries Section of the ANRD ran a Dolphin and Whale awareness week in early 2003 to promote awareness of these species. This proved to be very successful and it is hoped that this can become an annual event. In Summary: 18 months on from having signed up to the Environment Charter, St Helena has made some significant progress in implementing the Charter. We will continue to build upon this. However it should be noted that limited resources will impede future progress. With escalating staff losses targets cannot be fully met and efforts have to be scaled down to cope with a smaller and often untrained work force. In addition there is a lack of specialist-trained personnel in the environment and conservation fields and limited financial resources.		

Tristan da Cunha	The Gough Island Management Plan will be updated in FY 2003/04.	Three project bids submitted to FCO for FY 2003/04: (1) Updating the Gough Island Management Plan; (2) Clearing Invasive Flax from Inaccessible Island; and (3) Website for Tristan da Cunha. Two bids successful : (1) Updating the Gough Island Management Plan; and (2) Clearing Invasive Flax from Inaccessible Island. A project bid to Defra's Darwin Initiative on "Empowering the People of Tristan Da Cunha to implement CBD" has been successful (results announced March 2003).	
Turks & Caicos Islands	FCO is funding an Environment Charter pilot project in TCI. It has broadly the same aim as the Falkland Islands pilot, ie, of developing an action plan for implementing the Environment Charters. A review of key legislation on Land Based Sources of Pollution has been undertaken. The results reflected that regulations in place to deal with these issues are few and lack comprehensiveness with respect to minimising the impacts to the aquatic environment. TCI is also in the process of developing a Protected Areas Policy, which will have as an annex the SPAW protocol and other key policies and conventions that develop over time rather than create new legislation However, recent development proposals have caused concern. This includes the TCI Government's proposal with Holland America, who propose to invest $25 million in Grand Turk (pop. 3,000) for the construction of a pier and on shore facilities for up to 14 ships per week, and 300-500,000 passengers per year. The wall and the Columbus passage which falls to 7,000 feet a few hundred yards of Grand Turk are also the principal migratory route for whales. Holland America's project will irrevocably change all of this. HMG have raised concerns about the quality of the Environment Impact Assessment.	Resources and expertise to take forward/implement the CITES and SPAW and LBS Protocols. EPD await project bids to the Environment Fund for a legal consultant for this. The provision of training and building local capacity with requisite expertise and experience (possibly through attachment schemes). Retainment of trained staff is also an issue. Funding to implement programmes and to procure tools and technology. Three project bids submitted to FCO for FY 2003/04 : (1) Digital habitat mapping; (2) Field-road trails in biodiversity and sustainable development management plan; and (3) Establishing a biological records system. One bid successful: (1) Field-road trails in biodiversity and sustainable development management plan.	**Project proposer** **Carl Malin, OTD** **Carl Malin, OTD**
OTs General		Four cross-OT projects submitted to FCO for FY 2003/04: (1) Seed Conservation in the OTs, covering St Helena, Ascension Island, Falkland Islands and British Virgin Islands; (2) Training in Sea Turtle Biology and Conservation, involving all Caribbean OTs plus Bermuda; and (3) Celebrating Fragments of Paradise – the Environment Charters and Arts and Crafts in the UKOTs, involving Anguilla and Cayman Islands; and (4) UKOTs CITES Virtual Forum Network, involving all OTs. Three bids successful: (1) Seed Conservation in the Ots; (2) Training in Sea Turtle Biology and Conservation; and (3) UKOTs CITES Virtual Forum Network.	

Topic 3: Managing conservation organisations

Like the other sessions, this topic was selected on the basis of a wide consultation around the UKOTs and other potential users. It is a diverse topic, and the papers cover much of this range. One aspect where we tried for greater coverage was in relation to fund-raising - but the difficulty in securing speakers here is perhaps a reflection of the very few funds available to support environmental work in the UKOTs.

Helping to develop locally based conservation organisations has been a priority of the Forum, and this section starts with an encouraging report on the establishment of a National Trust in St Helena, by bringing together the pre-existing NGOs and collaboration with Government.

The challenges of, and approaches to, organising conservation in a dispersed country with several levels of government is well described in the contribution from the Netherlands Antilles. A brave approach to re-organising official conservation bodies to fit the changed needs is described from Bermuda, where the Forum's guidelines from 1998 were put to an unexpected but welcome use.

The key role of volunteers is well brought out by the paper from Gibraltar - and this role had been well demonstrated in the effective running of the Calpe 2000 conference in Gibraltar. This crucial role, particularly in the area of awareness-raising in visitors, is stressed even more in the Falkland Islands, where mechanisms are still needed to use some of the income from visitors to repay the costs of voluntary organisations in management of the sites on which the tourism depends.

The potential and value of a computer-database-assisted approach to the efficient management of a conservation organisation and its sites is well shown in the presentation from BVI. The use of the Forum's web-site (www.ukotcf.org) and its database as a means of making everyone's work go further and be more widely accessible is outlined in the Forum's paper.

Clearly, the various topics overlap. Much of relevance to this topic will be found also in papers in the other topics, for example those from the Bahamas and the Isle of Man in the previous section, and from the National Trust, the Cayman Island and New Caledonia in the following one.

Chaired by: Fred Burton, Cayman Islands (left); & Amanda Outerbridge, Bermuda National Trust (right)

Establishing a National Trust in St Helena

Barbara George, Executive Director National Trust

George, B. 2003. Establishing a National Trust in St Helena. pp 78-86 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Establishing a National Trust in St Helena had long been an aim, but the way forward was not realised until a date was set for the 500th anniversary of the Discovery of the island. The Nature Conservation Group was very active, as were other related organisations, Heritage Society, Fishermen's Association, Arts and Crafts, Tourism, Farmers and Dive Club. The Trust was set up to bring together these groups, to achieve more effective conservation, partly through joint working with Government, and directly in response to the White Paper encouraging the involvement of volunteer organisations in discussions to develop an Environment Charter. The FCO's Environment Fund for Overseas Territories gave a grant for 3 years, and, with help from a visit by Martin Drury from UKOTCF, and much work and support locally, the Trust was launched on 21 May 2002. The Office was opened officially as from the appointment of the Director in September 2002.

Barbara George, St.Helena National Trust, Broadway House, Jamestown, Island of St Helena STH1 1ZZ. sth.nattrust@helanta.sh

St Helena Island is home to an amazing number of endemic plants and tiny creatures. St. Helena had 49 endemic plant species:

- 13 ferns
- 5 monocotyledons
- 31 dicotyledons

These include 10 endemic genera

Six endemic species have become extinct; four are extinct in the wild; and four species have wild populations of less than 50. Destruction has been by humans, goats, and other invasive animal species.

There are no large wild animals; the mosquitoes do not carry malaria; and the centipedes and scorpions

Endemic ebony flower

Endemic wirebird

do not give fatal stings. Everything is low key, and outsiders can find it unusual or frustrating, depending on their temperament, but eventually appealing.

I have lived there now for 32 years, being married to a St Helenian, bringing up our 3 children, teaching, researching and owning and running a bookshop for 5 years. These are my credentials for being here now, as Director of the very new National Trust.

James Valley from the sea

The National Trust of St. Helena was a dream that people have had for some time, although we are only 5000 people (dwindling fast, incidentally - see Appendix). We also have about 98 voluntary organisations, with many of the same people being involved. Rebecca Cairns-Wicks made this pont well in a presentation to the UK Overseas Territories Conservation Forum some years ago, and her talk then was published in the special UK Overseas Territories issue of *Ecos* in 1998.

These groups have all been operational for some time. Particularly active have been the Heritage Society and the St. Helena Nature Conservation Group.

The Heritage Society

The Heritage Society, started in 1980, found support and funding to open a new museum for the quincentenary in May 2002.

The St Helena Nature Conservation Group

The St Helena Nature Conservation Group, formed in October 1993, has a dedicated committee. It organised a walk every week during 2002, producing walk leaflets, grading the hikes, and adopting the letterbox idea to promote interest, so there is a little passport sized book to take and stamp at each of the sites. This proved extremely popular. Dr Rebecca Cairns-Wicks also managed the Millennium Forest Project, to plant endemic Gumwood trees on the site of part of the Great Wood lost in the 1800s. In 1977 the gumwood had been adopted as the National Tree of St Helena. The present idea started in the 1980s when 6.5 acres was successfully replanted with endemic gumwoods. Over 5000 trees were planted and this involved the whole community, the voluntary organisations and tourists. This Forest is now flourishing, and this has transformed 32 acres of arid wasteland.

This is a real success story. A biodiversity monitor-

Millennium Endemic Gumwood Forest with gumwood inset

ing programme for the forest has been incorporated into the new "A" level Environmental Studies syllabus.

Towards a National Trust

All organisations connected with the environment were invited to join the discussions on forming the National Trust at the early stages. The UK Overseas Territories Conservation Forum facilitated the development of an initial approach and helped Rebecca Cairns-Wicks to draft a proposal which secured a small grant from FCO's Environment Fund for Overseas Territories to help start the Trust. DFID adviser, Stephen Kidd, came in 2000, with the express mission of setting up a Civil Society Steering Group. This has not yet had a successful bid for FCO funding for an Information Office and Centre. However, the action was begun to form a National Trust.

The enthusiasm of Rebecca and her group, people in related areas and many others, was eventually tapped and channelled, when Miss Lynnette Bloomfield came to the island. She had the time, the enthusiasm and the contacts, and got stuck in to setting up the National Trust. She worked voluntarily, along with Rebecca and a lively steering group, for about a year, convincing local Government, and people that we needed this. UKOTCF and its SAWG continued to be very supportive.

Lynnette drew up detailed plans and a timescale. Of course everything did not happen to time, but fortunately people understood. The Project achieved its target outputs:

1. The drafting of the Ordinance and Regulations
2. The enactment of the Ordinance
3. The establishment of the Trust
4. A development plan.

The Ordinance to set up the Trust was enacted on 5 December 2001. The Regulations were approved by Executive Council for implementation on 1 May 2002.

Some of the FCO Grant money was used for:

- travel and subsistence costs for Martin Drury (the Director-General of the National Trust of England, Wales and Northern Ireland); he visited, after his retirement in 2001 on a voluntary basis arranged by UKOTCF, on which he now serves as a Council Member;
- a well publicised launch on St. Helena and in UK simultaneously;
- the production of Brochures;
- professional advice;
- minor expenses, like decorating the new office. We are limited for choice on our isolated spot on the globe, so the paint was yellow, but with our slate blue curtains, it is certainly the most cheerful office in town!

Many people in St Helena, UK and elsewhere gave of their time and expertise to save as much as they could of this money, to be used later when the Trust finally became operational. The legal officer did not charge a fee for drafting the legislation, and innumerable e-mails, phone calls etc. to the UK were donated. From St Helena that is quite something, as we are probably one of the most expensive places to communicate with in the world.

The Trust now encompasses 8 of the pre-existing voluntary organisations – Heritage, Nature Conservation (which includes Millennium Forest Project), Fishermen, Dive Club, Arts and Crafts, Farmers and Tourism. More recently, we are delighted that the Hon. French Consul has joined the National Trust. He looks after Napoleon's House at Longwood, the Briars property and the Tomb site.

Napoleon's House, Longwood

Briars Pavilion, where Napoleon stayed for a short time before Longwood

The Trust's Office at Broadway House (right) and its location on Jamestown Main Street (below): it is near the bottom right on the picture.

Locally the Trust founders negotiated with St Helena Government (SHG) for an office. They had hoped to move in to the two rooms vacated by the museum, in Broadway House, but eventually were allowed only one, but that at the front of the lovely old Georgian Building, where I have had tea with the owner, Bob Broadway, many years ago.

On 7 May 2002, the first AGM was held and Officers and members elected onto the National Trust Council. On the 21 May the Official Opening took place on the steps of Broadway House. This is an old building belonging to SHG and we have only a lease of the room, but we hope that eventually we will be able to raise funds to restore it to its former glory. When construction work next door is finished, we will ask that the front be decorated. However since we have been there, with a little encouragement, SHG has tidied up and painted the back yard and the toilets, so that it is no longer embarrassing when we have visitors. The visit of the Princess Royal in November may have had an effect here!

Between St Helena and UK we have about 100 members to date, and have more plans for recruiting when I return to the island. Stalls on cruise ship days have not been successful in finding new members, but we continue to try.
Between the launch and September 2002 not a lot happened. Another grant had been applied for, to FCO, for a 3-year start-up project. Having got this far it was not thought that this should be a problem. Obviously assurances must have been given, as the Trust went ahead with the advertisement for a Director. However, it was not until 4 October 2002 that a letter was received confirming that the money for the first year had arrived. I had started work on 16 September 2002. The confirmation of the 3 years budget came in December. This money is essential to pay salaries – myself as full time, and eventually a part-time assistant, to equip the Office, keep it running, and provide a little for minor projects to start. It decreases the next two years and is not enough to finance any large projects.

This is a huge challenge for me. In addition to the museum and the Millennium Forest already mentioned, two additional inaugural projects are already in place. These are running well under the capable management of member organisations, although they need constant money to sustain them. These two additional inaugural projects are-

Schools Project

So far we have had meetings with the teachers in the middle schools, after studying their syllabuses, and discovered that at this stage, the best help we can offer as quickly as possible, is to prepare resource packs for schools in the area of local history, geography and science. One teacher commented that it was easier to teach British history rather than local because of the lack of resources. So, the Museum Curator and I are working together on this and there will soon be resource packs in Middle Schools. This is the first time that people have been in paid posts such as Museum Curator and National Trust Director, and the impact is immediately apparent. We have the

Prince Andrew Community School

time, the interest and the materials available to do this thing which will at once improve the children's knowledge of their local surroundings. I feel really pleased about it.

Restoration of a Flax Mill

Finding an Old Flax Mill to restore is more of a problem. At present we are applying for Scott's Mill – the most central site for tourist trade, but it belongs to the St Helena Development Agency. It has been altered to adapt it for two businesses which did not succeed there, and they are advertising again to see if there is anyone willing

Fairyland flax mill in the distance

Scott's Mill

to hire it for business. If not, then we have a chance of getting it. The machinery for the mill will be donated by Nick Thorpe, a long time Heritage Society member, and their representative at National Trust. He reckons it will take about £16000 to prepare the Mill and set up. We will seek funding when we have the building, but if there is anyone here who would like to suggest a source, then I would love to hear from you. We are very new at applying for funds, and knowing who would help.

There is also a small flax engine in the Pipe Building in Jamestown. This has been locked up for many years. We have asked Government to allow

Old photograph of flax workers

us to use this as a very central and fairly immediate flax museum. It would only need tidying up, refurbishing the engine which is in place, and display boards, but so far the answer has been negative. We await a reply as to what else is proposed for this building. It would be a good start, and give us a real boost, as the money required to do it up would not be so great.

National Heritage Register

In my job description, I was also asked to establish a National Heritage Register. In fact this was the first job I organised. The Trust had agreed to have a student volunteer from UK, who arrived a week after I got there. Fortunately he brought his own laptop computer, so it was easy to know what to give him to do.

High Knoll Fort, with inside view below

Woodcot, restored in the 1970s

Since I had given up teaching in 1992, inspired by Trevor Hearl, the Cheltenham historian who knows all there is to know about St Helena, I had begun to do research in the local archives. I also determined to get all Trevor's leaflets copied for files in all the schools and libraries, and to make available all the wonderful old St Helena books and prints that, with my husband as Chief Education Officer on the island, Trevor had sent to him for the new Prince Andrew Community School. Between them they had agreed that it would be wonderful to have the children on the island surrounded by their heritage, and they worked on this for many years.

Prince's Lodge, housing the private collection of prints of St Helena (below)

Plantation House, the Governor's residence

Sandy Bay Baptist Chapel - made of phonolite

Teutonic Hall - in need of repair

At that time there was no computer program available, and there was no-one with the time to write one. It was amazing to me to find Access on the market, and we now have all the books and prints listed on there – this includes Trevor Hearl Library at Prince Andrew School, the Public Library, Agriculture and Natural Resources Department Library, and Plantation Library. Books at the Archives are also listed. We hope to add antiques and fixed contents of houses eventually, as many people on island are aware that "things" do disappear. Having a photographic record should, we hope, stop this happening.

Cliffs and Speery Island

Honorary member Mr George Benjamin, who discovered the lost ebony and worked with endemics, and who now takes tourists on special trips

Current position

Since September:

- We have regular monthly Trust Council meetings, usually well attended, with enthusiastic members, who are very supportive.
- I have met with the member organisations who have regular committee meetings
- We are publicising ourselves locally with
    - newspaper articles,
    - a weekly radio programme, where I read some local history,
    - monthly reports from the Nature Conservation Group,
    - interviews on local radio
    - display boards outside the Office, in a busy hallway.
    - stall at Agricultural Show for Princess Royal, where the President and I had the honour of meeting her.
    - stalls for visiting Cruise ships (not very successful)
    - web page

    - other websites e.g SHG, Eden Project
    - distribution of leaflets to shipping etc
    - overseas journals and newspapers – hopefully this visit will generate some media publicity. The St. Helena Catalogue presently publishes articles
- I have submitted our first 6 monthly report to FCO, and completed a draft 3 year plan

This visit here to this Conference, which was in the balance until 2 days before I left, is part of our overseas publicity. Since I had to leave St Helena on 14 February, on the last ship out for 5 weeks, I needed to stay in UK, so have made a timetable of people to meet, courses to do and visits to make. It is so expensive to travel from St Helena, so this is a wonderful opportunity at the start of my work, and I look forward to getting to meet as many of you as possible.

What does the future look like?

We have lots of ideas, but first we must have an income.

Commitment to funding by St Helena Government must be sought. It has been suggested that they could pay the salaries, or establish an environment fund giving a proportion of the landing fees to the Trust, but all this has yet to be discussed.
We are thinking along the lines of the Landmark Trust. Asking SHG for one of their historic old houses, doing it up, furnishing it with antiques and advertising on the international market for a high rent for tourists (see pictures on next page).

Views of Bertrand's Cottage, a possible Government House to use for tourist rental

- Obtain Registered Charity Status in UK
- Find other Funding Sources
- Sale of NT publications

Any suggestions will be considered, if you let me note them down

I love my work, and it is great to be in a job you enjoy. Most people are very co-operative, and the member organisations work well together, and consult with us so far. I really look forward to the next 2.5 years, and feel sure we are at the start of something good for St Helena.

Other ideas include:

- Souvenirs
- Contacts with other related places – In S Carolina and Australia
- National Trust Open House Day – when Plantation House, Longwood House and others could be open to the public for a fee.

Honorary member Mrs Jessica March, best lacemaker still, who demonstrates this craft to tourists

Appendix: Why do Saints leave home?

(poster presentation)

It is not so difficult to understand that young people in 2003 are very different from those of the 1960s or 80s. Life on St Helena is much better materially, and they have the opportunity to get a job overseas. Who would not seize it? The Falklands opened its doors after the War in the 1980s, and Ascension takes many more people now than before. UK citizenship has been restored, so people need no longer go cap in hand to someone looking for a job. They can go to the UK and find one.

Of course, it is not all rosy. The Falklands are cold and windswept, and I understand the life for most is barracks style. Ascension is hot and barren. Britain can be dark, cold, wet and unfriendly. What is it that they all offer? Not simply more money – although that is a big factor – but also independence.

It is perfectly natural for young people to seek adventure, and I do not think that will change. However, after a time some of them and many of the older people, would like to come home to St Helena, having found it not such a bad place to live after all, and free from the troubles of the outside world. We need them. What is the problem?

The basic problem as I see it is a refusal to face the facts. Increases in pay of a few hundred pounds are going to go along with increased prices and taxation. These increases never identify the problem which is that the discrepancy in wages between St Helena and overseas cannot go on. If we want good teachers and nurses, we have to start paying for qualifications, and I mean paying – not tokens.

People need to feel they can be independent on St Helena as well as Ascension and the Falklands.

I want to look at qualified teachers. We need them and how. We have trained many over the years and they left. I left myself. At a meeting at Prince Andrew School before I gave up teaching, the parents indicated their concern and the feeling was that they did not care how much teachers were paid – they wanted their children educated. That was 10 years ago, and staffing has got worse. We have trained teachers who leave to clean rooms on the Falklands for more money.

We need to separate Education and Health, and find the funds to pay the professionals in those areas. As people become better educated, the economy will improve and people will not necessarily have to leave home for better pay. I think you start with qualified people. You pay a decent salary, which does not need to include expenses for a house and travel, as people live there, yet it makes them independent, helps them to save and feel they can take a holiday when they want to. Then you will see people coming back to live.

I would appreciate Saints response to this idea, to see how many qualified people would return here to work if they got a salary of around £15,000 - £20,000 as a teacher or a nurse, for example. I want to hear from all of you out there. Please reply to St. Helena Herald, who can keep them till I get back.

Let us look at the economics. A qualified local teacher earns about £6000 a year less tax. He/she resigns to go to earn more money. The replacement teacher costs the Technical Cooperation Fund about £50,000 if they have a family, and travel. If you paid qualified, local teachers starting at £15,000, this amount would employ 3.5 local teachers, improving the education standards 3.5 times

I know it comes from a different pot, but when are FCO/DFID going to realise that it makes economic sense to pay a decent wage? Education is the most important thing we can give our children, and it leads to so many strengths. I certainly would not have been able to give up teaching if I had been earning more than £4,800 per year

Harnessing volunteers in Gibraltar

John Cortes, Gibraltar Ornithological & Natural History Society

Cortes, J. 2003. Harnessing volunteers in Gibraltar. pp 87-95 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The Gibraltar Ornithological & Natural History Society (GONHS) grew in 25 years from a group of birdwatchers still at school to a well established and respected NGO, now with full time staff, but still largely composed of volunteers. No two situations are alike, and the success of GONHS in its growth in size and influence can be attributed to both personalities and situations. "Being at the right place at the right time" is a concept very important in harnessing volunteers. More important, perhaps, is *knowing* that you are, precisely, there.

The transition from watching birds because you enjoy it, through the gathering of scientific data of importance, to taking an active part in campaigning for conservation, entering the decision making process, and having an active conservation programme only seems a logical one in retrospect. All this has happened in Gibraltar, with very positive results for the conservation of wildlife and habitats. There are difficulties, of course. Resources are used up as soon as they become available, and the knowledge that there is so much still to do can be daunting and tends to demoralise volunteers who cannot sit back to enjoy their successes.

GONHS has developed – or better, is continually developing – a way of working that allows rapid decision making to go hand in hand with consensus of opinion. It requires of those making the decisions that they be fully aware of the feelings of the members. A horizontal hierarchy, and a policy in which everyone contributes as much, or as little as he or she can, has achieved the desired results among the volunteers. This philosophy fails when the workers are employees. Combining the work of volunteers with a newly emerging cadre of full-time staff, most of them formerly in the ranks of the volunteers, brings with it problems that need to be tackled sensitively. It can result in further achievements, but can threaten the fabric of the organisation.

Time needs to be taken in knowing your colleagues well – something that is quite easy to achieve in a small community with insular characteristics. In the end, as we shall see, the results speak for themselves.

Dr John Cortes, Gibraltar Ornithological & Natural History Society, PO Box 843, Upper Rock, Gibraltar. jcortes@gonhs.org

Introduction

Sometime in 1972, in the height of the Spanish blockade of Gibraltar, when the residents of the Rock could not leave their tiny enclave, a group of young teenage boys started spending the large amount of spare time they had bird watching. This small group of schoolboys, through the years, gelled into the Gibraltar Ornithological Group, which grew into the Gibraltar Ornithological Society, and then the Gibraltar Ornithological & Natural History Society – or "GONHS" as everyone on the Rock knows it now.

The Society has grown in size, and influence, in Gibraltar, and also abroad. In nearby Spain, despite the political situation, GONHS is respected and admired, and regularly consulted by official conservation agencies. As part of BirdLife International, GONHS is taking a lead, for example, in developing a new strategy to monitor bird migration across the Mediterranean.

But this short presentation is not about GONHS achievements, its merits, of its shortcomings – which like every other body, it has too. It is about how so much of this has been achieved through the efforts of unpaid volunteers, and about the pitfalls

Where it all started: A view of the Straits of Gibraltar - migration across this narrow stretch of sea was the inspiration of the first Gibraltarian birdwatchers in the mid 20th Century.

and benefits, of the almost inevitable step to having paid staff.

The early years

Early on in the existence of the Society, organisation ran along the traditional lines of a Committee with a Chairman, Secretary, Treasurer and two Committee Members. These were elected from what was a very small membership and never was an election contested.

As support and interest grew, it became apparent that there needed to be an expansion in the number of people running the organisation. This coincided with the opening of the frontier with Spain. In order to cater for the expansion in the area available to members, and to reflect the wide amount of wildlife in the region, the Society, as well as adding the words "Natural History" to "Ornithological" in its name, formed a number of specialist sections. Thus a Botanical Section, a Marine Section, and a Mammal Section were added to what became an Ornithological Section (once the only "Section"). It was only a matter of time before activities were added, leading to a Rambling Section, a Cliffs and Caves Section, and a Photographic Section (run jointly with the Gibraltar Photographic Society). Persons with known interest and/or expertise in these areas were contacted and asked whether they would co-ordinate activities in a Section within the GONHS umbrella.

The hierarchy was becoming more and more horizontal. The post of Chairman was not filled when it became vacant. The Secretary role became one of General Secretary/ Coordinator. The traditional Committee became an executive and the Section Co-ordinators assumed the role of a policy-making council.

In effect, Sections concentrate in the areas in which they are most interested. They range in number of "members" (there is only one form of membership, that of GONHS, but members can chose to be active in any or all of the Sections).

Clearly, in a small place as is Gibraltar, Sections cannot work in isolation. Thus, though only the "birders" will attend meetings to organise World Birdwatch, or the Winter Bird Count, or to discuss the collection of bird records, there will be those from that section, and from the marine section, or the botanical enthusiasts, who will want to contribute to discussion on a proposed urban development on a wildlife site.

This is encouraged. One of the main roles of the General Secretary is to ensure that there is ample consultation with all interested members in formulating policy and deciding in action. At the same time it is the responsibility of the General Secretary to be aware of the Society's policies and views so that instant action can be taken when necessary. Subsequently affected members and sections will be appraised of the situation and the logic and justification of these actions. They are of course free to disagree and to censure the General Secretary.

In all of this, e-mail is playing an increasingly important part. It is allowing the possibility of wide discussion, even including members who live away from the Territory, on most issues of importance, reducing the need to long, far-too-regular and tiring meetings and allowing more time to meet either socially or on field outings which allow informal discussion.

Very recently GONHS has set up an on-line discus-

How it all started: GONHS Volunteers out birdwatching

sion forum (www.gonhs.org/forum) which it is hoped will develop this further.

It is important that all members should feel that they have a contribution to make and that this contribution is heard and acted upon when appropriate. There are several basic ingredients of successful use of volunteers (and non-volunteers):

- all should be able to make an input if they should so wish
- no-one should be forced to make an input
- there must be someone to execute decisions and make use of the input

The third point is often the limiting factor. One of the main aims of the organisation, then, is to solve the problem of executing ideas and decisions. Success in so doing encourages more ideas and in turn generates a further requirement for implementation of these.

The work to do

Initially the work of the GOS consisted of collecting bird records. Counting migrating raptors and seabirds and grounded migrants were the main activities for the first decade or so. It continues to be an important aspect of the work. But other, more technical, work has been added. Bird ringing has developed, with volunteers training under the British Trust for Ornithology, and is carried out on a daily basis during migration periods. Botanical work has developed too, with a full species list now prepared, a book on the *Flowers of Gibraltar* (Linares *et al*., 1996) produced, and ongoing work, for example, on an inventory of invertebrates and marine life. More specialised work includes nest box studies and a programme of research into dolphins and the Barbary macaque *Macaca sylvanus*.

Increasingly it became evident that a natural history society had to look after the environment too and over the years there has been a growing emphasis on nature conservation and environmental protection. Thus advocacy became a major part of the Society's work. Through constant lobbying by letter writing, responsible press and media exposure, newspaper articles, radio and TV programmes, public lectures, talks to schools, exhibitions, etc., GONHS – still working exclusively with volunteers – gained seats in key governmental committees, notably the Development & Planning Commission. Less formally it became the recognised advisory body to the Gibraltar Government, the Governor's Office, and the Ministry of Defence, making a real difference to the way Gibraltar runs its environmental policy.

Advocacy outside Gibraltar, including attending conferences and meetings, often in Spain, is also carried out by volunteers.

Other direct action by volunteers has included the organising and running of conferences, editing of the Society's publications, refurbishment of premises, re-vegetation of sites, control of invasive species, vegetation clearance and habitat management, construction of ponds, propagation of native plants, collection of seeds for the Botanic Garden seed bank, as well as the more mundane tasks of cataloguing the library, filling envelopes and sticking postage stamps.

The amount of time that volunteers can supply will depend to a large extent on their personal situation:

Are they working?
Do they have "benevolent bosses"
Do they have family commitments?
Do they have other interests?
Do they perform voluntary work with other organisations?

This has to be understood, accepted, and above all, respected.

Going Professional

As work has grown, time demands have clearly increased. Certain basic essentials necessary for members became more and more demanding. Such a basic need as the issuing of reminders for subscription renewals, banking cheques and issuing receipts started to become time consuming and a burden on the volunteers responsible. This side of the work needed to be formalised and this was

International Recognition: John Cortes (GONHS General Secretary) (right) and Michael Rands (BirdLife International Chief Executive) (left) sign the agreement making GONHS a full Partner of BirdLife.

done by entering into an arrangement with the Gibraltar Botanic Gardens, which offered logistical support.

Government youth training schemes have been used to acquire extra help (essentially by offering young volunteers the opportunity of entering the scheme and so earn a small wage while at the same time offering a service to the Society).

But the employment of staff in a larger way began through the realisation by the Government that environmental problems are best dealt with by people who know about these things. GONHS was therefore able to offer expertise – gained largely by the volunteer force – in two key areas, the control of gulls (the yellow-legged gull *Larus cachinnans*) and the management of the apes (the Barbary macaque *Macaca sylvanus*). GONHS obtained Government contracts to fulfil both these needs. As a result, it now employs seven people directly to work within these contracts. Most of these had already been active volunteers within GONHS. Effectively this culture has resulted in much more value for a lot less money.

Harnessing volunteers

The success that GONHS has had in harnessing volunteers could be attributed to many factors. The overriding principle has been valuing everyone's contribution and respecting the limits to these contributions.

What is a volunteer, and how much can we expect?

Volunteers are exactly that – volunteers. The organisation can only expect from them what they are willing to contribute. Of course, there must be seriousness and reliability, and a sense of responsibility on the part of the volunteers. If the success of an event is relying on their contribution, then they must make that contribution. But overall, the organisation must accept that volunteers may have other commitments, often at work, and after that at home, and that they may not be there forever. Volunteers must not be made to feel under pressure to contribute.

They are there because they want to be, therefore they must want to be there.

The moment their work becomes a chore, their continued contribution is at risk.

Volunteers may sometimes stop being active. They must be given space. The period of inactivity may be just a few weeks, or it may be of several years. The organisation must never forget their existence nor their past contribution. Whether or not they renew a membership subscription, the organisation should keep in touch. Send them information, tactfully suggest every now and then that they may one day find time. Often they do, particularly if their interest is directly related to nature. If someone has had a passion for birds, he/she will always relish the thought of spending time with them again, and a request to take part in this year's winter bird count, helping to plant trees to create a habitat or organising a petition to protect another will often tempt them back.

In small territories, there are several factors that keep the interest of volunteers alive. One is that we often spend all our lives within a small area. Life is a continuous reminder of our childhood or of our youth. Every day for seventy years we may walk along the same route to work and see the same patch of scrub, or successive generation of the same bird. Every year for decades we eagerly await the flowering of our favourite bush, or the emergence of the first butterfly, the arrival of the first bird of the spring. If one day along this walk we see a notice of an intended urban development, it affects us. We feel personally involved. It is a part of us.

Volunteers need to be made aware – and to remain aware – of their value. There must be constant positive re-inforcement. Volunteers do not get paid for their work, so they need this other type of reward. They must be given credit for their own work and for the collective results. Their involve-

ment must be right through to the end – to that radio or TV interview, or that photograph in the newspaper. Board members, executives, etc. are often too exposed to the media anyway in a small Territory, and the Public always likes to see new faces. The well known faces can wait to be seen again another day. This involvement and promotion of the volunteers gains their confidence and trust.

And it must always be remembered that Volunteers are Volunteers. The organisation has no *right* to demand their time time. It is privileged to have it.

The issue of smallness

In a small territory, we have a sense of ownership, of a link to the land. This need not be a nationalistic fervour – nationalism is a political feeling the relevance of which will depend on the political situation in each territory – but it is a real link nonetheless. Our small country is the only land we have that we can truly feel a part of, and we are the only thing that our land has to defend it.

I recall a conversation with a good friend of mine, one of our longstanding volunteers, who, fed up with working too hard on one issue, said to me, "John, I feel like giving up. But if we give up, who will defend Gibraltar's wildlife? We could lose it all". He's still with us.

And of course, whether we like it or not, there is the question of pride. Gibraltar is very small. But people there are proud to be the most important bird migration site in western Europe, proud to have the Barbary Apes, proud to have their endemic flowers.

Another benefit of smallness in relation to volunteers is that accessibility to persons with influence – often Government Ministers – can ensure success more quickly than in a large nation.

But smallness can have one important negative effect: lack of variety and boredom. Or at least the ease at which you can get tired of hitting at the same problem constantly, or organising an annual event that seems identical every year. It is here that the old adage of "a change is as good as a rest" comes into play. If you cannot, due to the limits of size and facilities, change the event enough, then let the people organising it change and move to some other event. You will often find that somehow, the event changes emphasis too and becomes more appealing to organisers, members and the public.

Other Problems:

As I have mentioned above, voluntary contributions are often transient. People may get tired, they may develop new interests or commitments, or, as often happens in the case of people on work contracts, they may move away. As we have seen, these may be temporary lapses.

Young parents may find they need to dedicate time to new children. They often come back sooner than they think – and bring their children with them.

In the case of contract workers, our experience is that they can quickly become key members of the organisation. And then they go. While they often remain members, and are available to consult increasingly by e-mail, the work that they do on the ground can disappear. It is important to understudy such volunteers and not to depend too much upon them in the core running of the organisation.

As an organisation totally run and manned by volunteers starts to employ staff, an interesting situation arises.

If the employee is new to the organisation, a normal employer/employee relationship normally is established. The employee gets to regard the organisation as a whole as his/her employer, and the Board or Committee as the policy maker. But it is important that there should be an identifiable person who plays the role of "the boss". This person can be someone also employed in a supervisory role, or a specific Board or Committee Member. Otherwise chaos can ensue. The employee does not know who to relate to, who to come to with problems. Or he/she may use the confusion to advantage in avoiding work. It could happen that Board members will issue conflicting instructions to add to the confusion. Relations with employees need to be focused through an identifiable person. In GONHS this role is filled by the General Secretary. While this is in marked contrast with our philosophy of running the Society's voluntary and advocacy side, we must remember that an employee who sees employment as a job, a source of income to keep his/her family, will have certain expectations of an employer that are very different to those of an ordinary member of the Society.

If, on the other hand, the employee is a former volunteer, the situation is very different. It can work to the advantage of the organisation, but is potentially hazardous. A committed volunteer who

starts to work for his organisation usually starts off as a very happy person – getting paid for doing what he used to do for nothing, making his hobby his profession. This feeling could last forever. But again it might not.

- The pay may not be particularly good.
- It may be a short-term contract – what happens afterwards?
- A hobby becomes a job and so you need another hobby, or to do something different at weekends – which might keep you away from what you used to do as a volunteer.
- Your family may feel that "you spend enough time with that lot already – after work you stay with us".
- Your paid job may be in a new area of work so that if you are to continue doing what you used to do for the organisation as a volunteer you still need extra time. Should this be paid? Or worse, does the employee, or his/her family feel that this should be paid.

These factors may in fact *reduce* the amount of time that the new employee has available, especially after hours, to make a contribution in the area in which he used to be vital. And so, while a great deal of new work is done, much that used to be done before is not.

In fact, we have experienced this situation, and also the reverse. Volunteers who are used to work hard in many areas and love their work for the environment actually are positively motivated and spend a lot more time on Society work than previously - even in their own time.

As ever, no two individuals, and no two situations are the same. A great deal of tact is needed in resolving any problems that might arise from this.

The paid staff/volunteer interface also needs to be examined. Volunteers who have "good" jobs that they are happy with have no real inclination to take up employment with the organisation (even though the idea might sometimes appeal to them). But others, unhappy with their occupations, unemployed, or retired, may become resentful that their colleagues have found employment and get paid for what they continue to do for free. It will have a great deal to do with personalities, and must be treated with great sensitivity.

Volunteers from abroad

The kind of work done by the organisation may provide opportunities for widening the potential source of volunteers well beyond the confines of the Territory.

Essential premises: A Leeds University Ecology Field Course run jointly with GONHS at Bruces Farm Field Centre.

Partner organisations may be able to offer staff on sabbatical leave. These are often able to help in administrative tasks that have lagged behind or could not otherwise be realistically tackled, or to help out on particular occasions when the organisations resources have been stretched. GONHS has used staff on sabbatical leave from the Royal Society for the Protection of Birds (RSPB), for example, to input old ornithological records into a new database, and to assist with the organisation and running of a major European Meeting of BirdLife International.

The contribution of GONHS has been to provide accommodation at one of its field centres. The attraction to the volunteer has included a lot of migratory birds and sunny weather.

Volunteers from abroad are also forthcoming when they find the opportunity to do something they enjoy, or something that is valuable to them. In our case, two areas of our scientific work have come to depend largely on volunteers from abroad:

Bird ringing

Gibraltar currently has three ringers registered under the British Trust for Ornithology (BTO) scheme. These are all volunteers and one of these lives outside the Territory.

However, bird ringing during the main migration periods (seven months of the year) has been carried out on an almost daily basis. This has been thanks

Interesting results: The first ever Mountain Chiffchaff Phylloscopus sindianus *from Asia recorded in western Europe - a bird ringed by the GONHS ringing Group at the Jews' Gate Observatory*

to visiting volunteers, mainly from UK, who have manned the ringing station on the Upper Rock. Bird ringing has a great following in the UK, and advertising in the key publications, and then word-of-mouth publicity has meant that the scientific monitoring of passerine bird migration continues to be one of the main activities for GONHS. Clearly time and resources have to go into maintaining premises and equipment in good condition. But at the same time, this assistance by visitors releases time for the local ringers to do other work. As an example, one of the Gibraltarian ringers has now been able to dedicate some time to producing an inventory of night-flying moths.

Primatological research

GONHS has established collaboration protocols with a number of scientific institutions in a number of areas, notably research into the biology of the Barbary macaque *Macaca sylvanus*. In this case, the incentive for the collaborating institution, or the individual researcher, is the availability of research opportunities. Once again, a key ingredient is the availability of accommodation for researchers. At certain times, Bruce's Farm Field Station is in fact a macaque research centre. At these times, the GONHS staff working with the "Barbary Apes" are joined by researchers from Zurich University, the German Primate Centre, Vienna University, the Chicago Field Museum and Toronto University, all making use of the facilities for some aspect of research into macaque biology. While the results of these studies go towards individuals' Ph.D.s and augmenting the prestige of the institutions, there is a direct benefit to GONHS. Apart from adding to our research library, GONHS gathers more information on these animals than would be possible using local resources, information which can be used to improve the management practices which are the obligation of GONHS under contract to the Gibraltar Government.

Other visitors

Similar principles apply to harnessing other, less regular visitors. The Royal Air Force Ornithological Society (RAFOS), for example, holds occasional "expeditions" to Gibraltar. For their last visit in Spring 2002, GONHS provided logistical support and requested the carrying out of a number of censuses of the local birds, including one on the yellow-legged gull *Larus cachinnans* population. These were carried out successfully, and the results have been most useful, again, as gull control is another contractual obligation of GONHS.

Harnessing Projects

Reacting to external interest and desire for involvement turns the use of volunteers on its head. And so we can talk about the harnessing of *projects*. Volunteer-originated projects can arise from within the ranks too, and not just from external bodies abroad.

There will be persons who have an idea that they want to carry out. The standard way of tackling these persons would be to accept this idea provided it is within one of the organisation's priorities. However, in GONHS we try to capture this type of initiative by, as much as possible, trying to *make* the project a priority. Experience has shown that attempting at an early stage to steer the volunteer in another direction can easily result in losing both the project and the volunteer.

There must, of course be certain safeguards. The project, for example, must not conflict with policy or aims. It must have a fair chance of success and, as much as possible, at least in the initial stages it must be self-contained and not cause an undesirable re-distribution of resources. Volunteers should not be discouraged. Once they are on a project and feel supported, they are more accessible to guidance and direction.

Two case-studies will help illustrate the above points:

Upper Rock Habitat Management

Several persons, including one member, approached GONHS wishing to carry out some

"improvements" within the Upper Rock Nature Reserve. Their intention was to provide a "picnic site", clearing vegetation, planting trees and other plants, etc. Such work, if uncontrolled, could have resulted in important plants being removed and unwanted alien species being introduced, as well as potentially a great deal of disturbance in sensitive areas.

The approach, however, was to encourage these potential volunteers. Tools and materials were supplied for their work. But they were inducted in concepts such as the undesirability of alien species, the need for proper habitat management in some areas, and sites that needed such work were suggested.

As a result, this group of volunteers grew. All became members of the Society. They have carried out useful habitat clearance, planting of native trees, construction of ponds, and are now running a small nursery of native species.

Animal Conservation Park

As a result of the confiscation of illegally imported animals by Gibraltar Customs, GONHS became the custodian of a number of parrots and chimpanzees. This "collection" was soon augmented by more parrots and monkeys. Temporary facilities were provided at the Gibraltar Botanic Gardens.
The volunteers involved in preparing the enclosures and looking after the animals suggested the formalisation of the arrangement by converting a disused miniature golf course in the Botanic Gardens into an "Animal Conservation Park". While this was potentially a drain on resources both for GONHS and for the Botanic Gardens, the project was adopted.

The area, while still not finished, is now doing useful conservation work in housing and breeding confiscated animals. Support is provided during incidents resulting in oiled birds, and the facilities have become an integral part of the Barbary macaque management project, providing temporary holding areas for Barbary macaques that may need to be kept while awaiting veterinary intervention, testing, or exportation.

The Conservation Park has since attracted European Union Regional Development Funds and now employs three full-time people in addition to a small team of volunteers.

Summary

It would be dishonest to suggest that the strategies that have served GONHS so well in harnessing volunteers and developing its present structures were all planned in advance. GONHS has been reacting to situations as they have arisen. Perhaps because the main core of movers in the organisations are lifelong friends, there was the inherent trust and flexibility to adapt to changes.

There are several key factors which, in retrospect, can be said to have been instrumental in the development we have seen:

The organisation is small, or is divided into small sections.
This results in people knowing each other, being able to remain in contact, and in differences being resolved relatively quickly when they arise.

The organisation is structured with a mainly horizontally hierarchy.
There is central co-ordination, but all volunteers know they have as much a part to play in the running of their areas as they wish to have.

The person handling the volunteers has a vital role.
It should be someone who can take quick decisions, even if he/she needs to consult others later. Quick responses are needed or the volunteers may go elsewhere.

The volunteers should be encouraged first, guided later.
This means they will keep the initiative and feel the project is always "theirs".

Have an eye on the aim, not the individual.
In promoting aims rather than individuals, jealousies and competition for exposure are avoided and the vital team spirit is developed.

Resources should be provided whenever possible and not kept for a rainy day.
This may mean spending money which "could, perhaps" be used for something else later.

Having facilities for providing accommodation is extremely useful if you wish to attract volunteers from abroad.
This reduces costs for the visitors and saves a great deal of time in making other arrangements.

Discussion and Conclusion

The development of any organisation is a continuous process. But things change particularly either in the early years or later when external factors change. In the case of the Gibraltar Ornithological & Natural History Society, the changes in structure have outrun the administrative process and the organisational methods described have yet to be formally incorporated into the organisation's Constitution. This process is in progress. Had no changes been made in the running of GONHS pending a full review of the written constitution, it is likely that very little, if any progress would have been made. While legally these things are important, and in fact, in this case, the matter is being addressed, the flexibility to move with the times is essential regardless of this.

In any case, it is likely that, once the new Constitution is formally adopted by the members at a General Meeting, it will be time to change it again.

Reference

Linares, L., Harper, A. & Cortes, J. E. 1996. The Flowers of Gibraltar. Wildlife Books. Gibraltar.

How to evaluate your organisation's effectiveness as a conservation organisation, using the Bermuda Ministry of the Environment as a case study

Charles Brown, Bermuda Government Management Services

Brown, C. 2003. How to evaluate your organisation's effectiveness as a conservation organisation, using the Bermuda Ministry of the Environment as a case study. pp 96-99 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Re-structuring the Ministry of the Environment is described.

- Introduction and background – what led to the study/review
- Objectives of the review
- Ministry concerns and issues
- Trends and observations in the Bermuda environment
- Government commitments
- Mission statement
- Stakeholder consultation, comparative jurisdictions and feedback
- UKOTCF checklist on conservation

Conclusions and recommendations are given.

Charles Brown, Department of Management Services, Government of Bermuda. cnbrown@gov.bm

This presentation summarises the re-organisation of the Bermuda Ministry of the Environment in April 2002.

The Ministry of the Environment Division previously consisted of four Departments, namely the Departments of Planning, Agriculture and Fisheries, Land Valuation and Parks. The Ministry Headquarters included three staff specialising in environmental sciences.

Over the last thirty years the key economic indicators of Bermuda's traditional industries of agriculture and fisheries have been in a steady decline, e.g. the number of jobs and production output. As a consequence, concern had been expressed about the role and functions of the Department of Agriculture and Fisheries, and the effectiveness of the Environment Ministry in dealing with the environmental issues of the day. It had been suggested that the Ministry of the Environment:

a) needed a new focus and structure to better address the community's development and environmental needs in the context of increasing and conflicting pressure on the island's limited resources;

b) would benefit from an increase in resources and funding and an improved legislative framework to address current and developing environmental issues; and

c) needed to strengthen partnerships with key non-governmental organizations (NGOs).

Accordingly, the Ministry asked the Department of Management Services (an internal management consulting unit) to review the Ministry of the Environment's mandate and organisation and to develop a structure that would provide the Ministry of the Environment with the capacity to meet the community's needs for the next five to ten years.

An initial step during this review was to develop the following **mission statement** for the Ministry of the Environment:

> "To promote the sustainable development of Bermuda by balancing the protection, conservation and enhancement of the environment with the development needs of the community."

MSD consulted with all relevant stakeholders, both inside and outside of the Government including department heads, Statutory Boards, farmers, fishermen, architects, surveyors and NGOs including the National Trust, the Zoological Society, Keep Bermuda Beautiful (KBB) and the Bermuda Biological Station. MSD also consulted several overseas jurisdictions and the United Kingdom Overseas Territories Conservation Forum to identify components of a national environmental management model that Bermuda could adopt.

Management indicated several concerns:

- Inadequate resources to meet public commitments
- Not focused on current environmental concerns
- Not practising integrated, long-term planning
- Perceived to be lacking prominence
- Behind in the introduction of appropriate legislation
- Apparently playing a minor role in key deliberations
- Stakeholders concluded that the environment had not been a high priority with Government

Consultations with the former Department of Agriculture and Fisheries revealed that:

- The number of jobs occupied by fishermen has declined
- The number of vessels reporting catch information has declined
- The size/weight of annual catch has declined
- The number of jobs occupied by fishermen and farmers has declined
- The value of agricultural output has declined

Other important observations were

- The environment underpins Bermuda's Tourism and International Business industries.
- The balance between protection, conservation, enhancement and 'use' of the environment is delicate.
- Ensuring balance and seeking sustainable development requires comprehensive and integrated planning.

Summary of Stakeholder Consultations

The Ministry needs to:

- educate and communicate with the population i.e. institutionalize environmental consciousness
- lead in the conservation and protection of Bermuda's natural assets
- establish and support an integrated planning process
- build on and strengthen existing NGO relationships
- maintain 'envirometrics' and conduct relevant research
- strengthen protection and enforcement regulations
- refocus to effectively address current and evolving environmental demands and challenges

A review of comparative jurisdictions revealed that a 'Model' organisation does not exist. A model would depend on functions, scale, environmental attributes, protection and enforcement strategies, scope, and history

The review turned to a paper by the UKOT's Conservation Forum (Pienkowski 1998) which suggested the ideas which eventually led to the Environment Charters. This included a Natural Environment Checklist. (UKOTCF brings together NGOs and institutions involved in furthering conservation of natural heritage in the UK's Overseas Territories.) The checklist was adopted as Assessment Criteria:

- Participation in international conventions
- Department dedicated to conservation of bio-diversity
- Safeguards and management plans for bio-diversity sites
- Bio-diversity targets and plans to achieve them
- Monitor and report the state of bio-diversity
- NGO supported and consulted by Government
- Environmental impact assessment for major developments
- Ecological studies

Based on these broad stakeholder input, including perceptions of the Ministry's strengths and weaknesses, its roles and responsibilities and specific environmental concerns, MSD concluded that the

Ministry:

a) had knowledgeable staff with an appropriate orientation representing a good foundation on which to build;
b) ought to be primarily concerned with protecting the environment;
c) should be doing more educating, adopting appropriate conservation strategies, and improving the level of environmental planning;
d) required strengthening in a number of areas including, data and policy analysis and coordination, enforcement of regulations, stronger links to NGOs, and resources dedicated to research and development; and
e) should have an organizational structure that is determined by its mandate and business activities.

We conclude that the Ministry should undertake the following activities:

- environmental planning
- environmental training, education, public awareness
- setting environment "well-being targets"
- reporting periodically to the public on achievements
- supporting the work of compatible NGO
- promoting the development of integrated policies
- involving "compatible" sectors of the community
- advocating independent environmental impact analyses
- promoting environmentally friendly technologies
- advancing the passage of important legislation

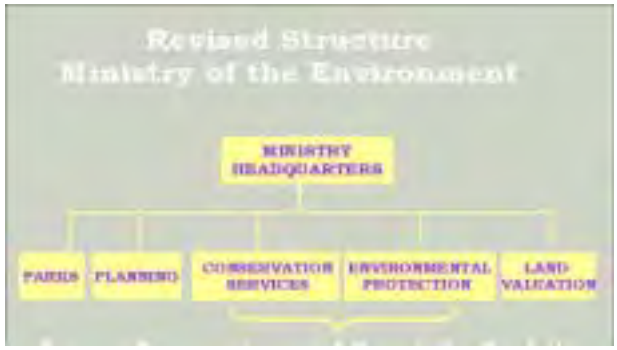
In order to accomplish these objectives the Ministry needed to re-establish its strategic direction and sharpen its focus by redefining itself organizationally and operationally with an emphasis on sustainable development and a balanced approach to meeting the diverse needs of Bermuda's residents. In addition, the Ministry needed to reclaim control of Bermuda's natural assets, strengthen existing resources, and take the lead on national environmental issues. In order to accomplish this, the following changes were implemented:

a) The Department of Agriculture and Fisheries was dissolved;

b) A Department of Environmental Protection was created by combining existing units from the Department of Agriculture and Fisheries, and Ministry Headquarters. This new Department will ensure that all laws protecting Bermuda's environment are up to date, effective, and applied vigorously, fairly and consistently. The Department will also ensure that environmental standards are established and that performance is measured and reported to the public on a regular basis.

c) The Department of Parks was expanded by adding the Horticultural functions from the Department of Agriculture and Fisheries. This expanded Department will develop, protect, maintain and enhance designated public open spaces (including parks, beaches, nature reserves, government-owned property, and other open spaces including the Railway Trail). It will also continue to regulate the use of the protected areas under its management and administration in accordance with the Bermuda National Parks Act 1986; and

d) A Department of Conservation Services was created out of the remaining units of the Department of Agriculture and Fisheries, where the Bermuda Aquarium, Museum and Zoo will be the core programme. This will include re-deploying conservation and forts personnel from the Department of Parks. This new Department is to promote the sustainable use and enjoyment of Bermuda's natural resources by imparting knowledge directly to active and passive users through demonstration, practice, illustration, education and publication.



Summary of outputs

- Cabinet approved the creation of the two new Departments
- Re-allocated programmes within re-structured ministry
- Two directors have been recruited
- Recruitment of an ecologist is planned
- Some job descriptions have been amended
- Discussions on legislative initiatives have begun
- Policy Positions are being drafted e.g. Marine Resources
- Strategic gaps identified are being addressed

Reference

Pienkowski, M. 1998. Paradise mis-filed? In special issue on “Dependent Tertitories - overseas, overlooked?” *Ecos* 19: 1-11. (This paper is available also on www.ukotcf.org; click side-menu Environmental Charters, and then Ecos link in text.)

Falklands Conservation – awareness raising in tourists

Rebecca Ingham, Falklands Conservation

Ingham, R. 2003. Falklands Conservation – awareness raising in tourists. pp 100-107 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Overview of FI tourism: Brief on the history of tourism, numbers of land-based and cruise ship passengers, passenger composition and vessel type visiting the Falklands.
Description of three tourist sites: Volunteer Point, Gypsy Cove and West Point Island, outlining the different aspects of accessibility, remote areas and types of visitor impact on these sites and their different environments.
Countering the problem: Raising awareness in tourists, working with the private sector, publications and information (countryside code), warden programmes.
The future: How to progress, problems with size of FC and responsibility, influencing landowners and government for island-wide protection, what basis for legal protection, how to implement

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Background

The first point to probably get across is why we actually bother about tourists visiting the Falklands and what we aim to prevent by raising awareness anyway.

The Falklands are unique in terms of the scale of their wildlife populations which are accessible to visitors. In the Falklands there are around 80% of the world population of black-browed albatross, 70% of the world rockhopper penguins, and other vast colonies of seabirds and mammals that can number several hundred thousand individuals. All of these animals are breeding through a very narrow time frame from November to March, when they are closely tied to their breeding sites and have restricted feeding ranges and timescale in which to feed and rear their young, moult, and in some cases, migrate north for the winter. The presence of humans around these colonies at very busy times of year can be felt significantly if visits are allowed to be disruptive. Actual disturbance can take the form of handling young for a photograph, getting far too close and causing the parent to leave the chick or the pup; this can lead in fairly immediate action by waiting predators. In king penguins, the incubation takes place on the feet, and if they lose the egg through this time, they will not reclaim it. So – one person trying to sidle that bit too close for a photo can result in complete breeding failure for that pair of birds for the entire year.

Visits to colonies that are not well planned can also result in blocking the access to the colony for birds returning from a feeding trip. Many of the Falklands colonies are on sandy dune or green areas where the easiest access by foot is from the seaward side along the shore, and this effectively means that an adult bird can be prevented from bringing its young a meal or swapping a shift with its partner for the entire duration that people are there. Not so bad if this is a half hour, but if a cruise ship has landed at a remote site and no-one points this out to the passengers who may be there all day, that could be the end of the chick or egg that those birds are trying to rear.

Finally, the last two points are fairly similar and both involve physical damage to the environment. The soil of the Falklands is very soft and easily damaged peat. Vegetation takes a long time to recover, and the persistent wind can strip exposed soil quickly, so both fire and erosion can have devastating effects.

In the overall context of the Falklands, tourism is a growing and developing industry which links well in with the aims of the Environment Charter, which was signed in 2001.

The overall aims of the Environment Charter are based around a healthy environment, undertaking protection and improvement where possible or necessary and this links with an industry based on natural resources requiring a healthy environment to be appealing to its customers.

An important point within the Charter is the search for solutions which benefit both the environment and development. In the case studies highlighted in this presentation we outline how we are trying to do this in the Falklands. Finally, the identification of environmental opportunities and costs are reflected well in the opening up of key wildlife areas for the public to enjoy and see, but there is a note of caution that this will involve a cost, both to the wildlife and an actual financial cost in ensuring the habitat and animals are protected from harm and disturbance.

Cruising Tourism in the Falklands

Throughout the history of tourism development in the Falklands, cruise ship passengers have formed the bulk of tourists visiting the islands. This is partly due to the cost of getting to the islands – over £1500 for flight as a tourist from UK and around £500 from nearest South American airport. During the 2002-3 season, figures are estimated to be in the region of 50,000 visitors, including passengers and crew, with only 1,600 or so land-based tourists. This leads to the vast majority of Falkland Islands tourists having little time in the islands, a relatively low level of information before they arrive and only a brief amount of time in the islands to see what they want to.

Cruise ships have been coming to the Falkland Islands since 1968 with Lars Eric Linblad bringing the first one to West Point Island – *The Explorer.* Since then, cruising has continued to be the most popular way of visiting the Falklands, with the industry developing to include larger vessels and Falklands-only itineraries.

The main reasons for this increase are the geographical location of the Falklands – on the way to Antarctica for expedition ships and a convenient add-on destination for ships travelling the South American cone. Since terrorism became an issue for many tourists, the South Atlantic and Antarctica has provided a ‘safe’ option, and cruising has replaced the need for flights in many cases. The added bonus of unspoilt scenery and an abundance of wildlife also add to the attraction of the Islands.

There are three main types of vessel that operate in and around the Falklands and each has a slightly different emphasis and impact.

Firstly are the expedition vessels, which have a strong environmental emphasis and are mostly members of IAATO (International Association of Antarctic Tour Operators). Nearly all of these passengers are well informed and are on these trips with the aim of seeing wildlife. In addition, most of these vessels have a high ratio of guides and lecturers on board, many of whom are expert in their field. The environmental impact of these vessels is therefore limited and controlled, with strict guidelines on approaching and photographing wildlife, as well as cleaning boots prior to visits to prevent disease and the removal of any natural artefacts.

The next type of vessel is what we refer to as 'soft adventure'. These are the vessels where the emphasis is on a more luxurious voyage with higher passenger numbers and more facilities on board, but the main driver for most passengers is still wildlife. These vessels typically carry around 300-500 passengers. The potential for environmental impact is greater with these vessels as they have fewer guides, generally are less well-informed, and obviously because the numbers are higher in any one site at any one time.

Finally, the last type of vessel is the luxury cruise vessel, which typically carry between 600-2000 paseengers. These have high impact / low education / high numbers. There are very few guides on board and little environmental information or wildlife guiding. These vessels have a serious potential for disturbance, especially at sites without wardens.

What we are seeing in the Islands at the present time is an increase in these luxury vessels, resulting in a rapid increase in overall passenger numbers. This is largely because of increasing South American cone trips and the development of Falkland-only itineraries.

This in turn is seeing a change in Falkland Islands tourism from well-informed, well guided, small groups of environmentally based tourists, to a more general tourist without any wildlife knowledge, in larger groups, with fewer guides and resulting in more potential for damage.

Land-based tourists

Whilst there are much lower numbers of land-based tourists, the potential for impact is far greater per tourist, because they are on the islands for several weeks, travel widely around remote sites and are nearly always unguided at wildlife sites. Most of the visitors are UK, South American or European based and there is a high proportion of them on wildlife, photographic or historical based holidays.

There are four main wildlife Lodges around the islands, Sea Lion Island, Pebble Island, Port Howard and Weddell Island, which generally get booked up throughout the summer. In addition to this there are 15 self-catering cottages scattered on offshore islands and in main settlements in East and West Falkland.

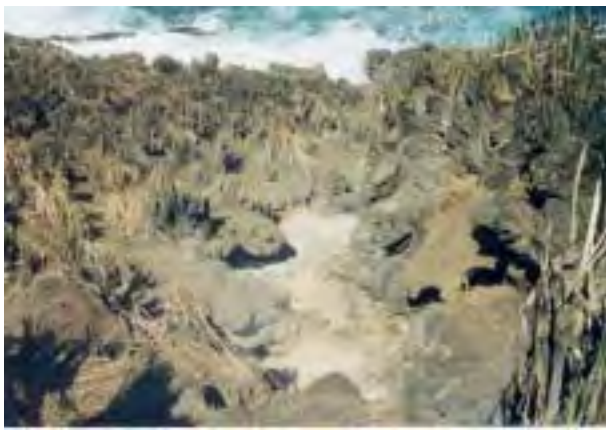
Most land-based passengers still use the air-bridge between the FI's and UK which operates every five days through the military, from Brize Norton in UK to Ascension and then on to the Falklands. This costs around £1500 per visitor and is therefore pretty restrictive on the cost front alone. Increasing roads have obviously added to the potential for land-based access around the islands. Vehicles can be hired and access gained to fairly remote sites.

Military Recreational visits

In the Falklands there is a permanent garrison of 2,200 on postings, which range from 4-18 months. At Mount Pleasant, the military base, which is about 35 miles from Stanley, there are pretty limited facilities and most people leave Mount Pleasant for their 2-3 day rest and recreation (R&R).

The most popular R&R destinations are the Lodges mentioned before, where they are catered for and these places are geared up for groups, but often the self-catering cottages are used and in these cases there can be some serious potential for disturbance as the information they have been given before and during their trip is limited.

What Falklands Conservation do to try and counter that is inform the military personnel about Falklands wildlife before they actually get to see it. We do this by lectures at Mount Pleasant Airbase,



Fire on South Jason – example of the worst possible kind of lack of education.....risks not made clear to the team – tried to detonate ordnance on hot dry summer day on remote island nature reserve....

Very lucky albatross – the majority escaped the worst of the fire, but more by luck than anything else. Many young birds were abandoned as a result.

around twice a year for two-three weeks, as well as awareness posters, leaflets and information on each of the main R&R sites that they will visit. One of the best ways to get them involved and keen to learn about the wildlife is to get them out into the countryside and actually doing something, so we

try to organise volunteer activities at least twice a year. These range from beach-cleaning, tussac planting to pond clearing and fence building and all of these events have been a real success, with both the military enjoying themselves and the jobs being completed successfully.

Falklands Conservation's Role in Tourism

So, how do we fit into the grand scheme of things in Falklands tourism?

The first and most key element of what we do is trying to educate the tourists about what they will see and how to act around the wildlife to reduce any impact they may have.

There is also an important aspect of providing advice to Falkland Islands Government (FIG) on the environment and gently reminding them that this industry will not be sustainable if measures are not taken to protect what people are coming to see in the first place. Because of the nature of the Falklands, each site has different pressures and problems and a separate approach is needed for many of the key sites around the islands.

The numbers of independent tour operators and private guides around the islands are often knowledgeable in a broad sense about Falkland Islands wildlife and history but may require additional information and guidelines for particular sites. Because tourism for many in the islands is a relatively new concept, as is the whole idea of wildlife being disturbed by numbers of people, quite often it is just a case of pointing out to the landowners or guides that these things are potential problems and suggesting how to reduce them.

Finally, the active part of our role happens when we can see a problem increasing beyond the point where simply receiving information mitigates against it and this has happened in a couple of cases.

Some Case Studies of Falklands Tourism

Gypsy Cove

The first site is Gypsy Cove. This is a Government owned site close to Stanley, which experiences severe visitor pressure throughout the season. The first point to stress however, is the relative ease of implementing measures here, given that it is a government owned site and forms part of the Cape

Pembroke National Nature Reserve. The site itself is a burrowing Magellanic Penguin colony, with around 300 breeding pairs of birds, which nest often up to six feet along in burrows in the soft peaty soil. This has led to problems with people walking on burrows and falling through, destroying the nests, as well as erosion all around the site.

Because of the road access and its close proximity to Stanley, the site has around 10,000 tourists per year. The majority of these visitors arrive by bus, and are dropped off to explore the site on their own. There is little or no guiding by tour operators and, until measures were put in place, there was much disturbance to the birds, such as photography down burrows and in some cases even handling the birds or chicks to get a picture of them.

From a public viewpoint, the facilities are very limited, There is a portable toilet and 2 wheelie garbage bins only. The paths are basic and uneven, with barbed wire fences very close to paths and little guidance as to where to walk. The erosion at the site is now severe and Falklands Conservation has been pushing for a couple of years to get boardwalks in place to alleviate this.

The area itself is a tiny site for this intense pressure, only 8ha in total, so the birds in this area are under constant stress on a busy day, when there can be in the region of 1000 people there. Falklands Conservation initiated a warden programme in 1998, with volunteers and FC staff. This has now been developed by the government and taken on as a responsibility and run by the FIG Tourist Board. Around 6 wardens work here on a part-time basis, with at least two-three on each cruise ship day. Despite some problems with policing and having the authority to remove people from the site, it basically prevents further disturbance to the birds. A lot of the wardens are now expert on the birds and their behaviour, so they also act as guides and enhance the experience for tourists at the site. Gypsy Cove is an example of how information and provision of knowledge can help alleviate severe damage to tourist areas.

Volunteer Point

Volunteer Point is a remote King, Gentoo and Magellanic Penguin colony on East Falkland which is open to tourism through several local tour operators which charge for the day trip overland. The cost is around £150-200 per day and the drive is pretty notorious. It is part of a large sheep farm and the landowner charges £15 entry to the site. The main environmental impact that people have here is getting too close to the breeding king

penguins, who incubate their egg on their feet, so if forced to move away from a curious visitor, often lose the egg and don't regain it, causing breeding failure.

The difficulties of getting to the site do prevent people accessing the site, but more generally people will still give it a shot, and then need dragging out of bog-holes by the farmer and the tractor. The farmer now charges for this service – and probably gets more from the military this way than by charging for the penguin trip! Because it is only three hours from Stanley, some cruise ships organise day trips to this site, whilst others actually land at the site itself, and access the beach by zodiac. The privately operated tour guide services do act as a form of control to disturbance, but many of them have a limited knowledge of the biology of the birds and there is a strong sense of ownership of the penguins, with some tour guides actually encouraging photographers to get as close as possible and feeding skuas to attract them closer to vehicles with visitors in. The size of the site means it can absorb quite a lot of people, so at any one time you could have people viewing several different things, which does help to reduce the pressure on any one colony.

For the last two years, FC has provided a volunteer warden at the site for the tourist season. This was initially met with a lot of resistance from tour guides, who felt that they were being checked up on. This has now passed and most of the guides are actually pleased to have someone up there all the time, as it gives an added dimension to the trip to be able to talk to the warden and pick up the minute detail of life in the colony and the day-to-day happenings. Rotterdam Zoo actually funded the post and also provided funds for three large information boards and a small caravan, which is situated at the car parking area and acts as a display and education point, where people can chat about the birds, look at posters and collect free leaflets and magazines about the site.

West Point Island

The final case study is West Point Island, which can only accept tourists by sea, and which has recently had a landing ramp constructed to take larger vessels and larger tenders. There are limited guiding facilities at the site and it represents a popular site, being famous for its history and the black-browed albatross colony. The potential worry here is that greater pressure will result in exceeding the carrying capacity and, as larger vessels visit, the proportion of those tourists who are unguided will increase.

How can FC raise awareness?

The first, and probably most effective measure, is more information. One of the major ways in which FC has made this available to tourists is through the Site Guide, published in 2001. This covers all the remote sites where cruise ships land and is designed to act as a guide for groups of people on their own. It shows you what to look out for, how to approach certain colonies and warns of easily disturbed areas. By explaining to people the possible risks, it reduces their impact significantly when they land.

Other things that we regularly produce include leaflets and trail guides to popular areas, as well as leaflets explaining what conservation work is being undertaken at certain sites. This not only raises awareness of the wildlife, but also of other threats and action being undertaken to protect the Falklands as a whole.

Finally, during the course of producing the Site Guide, it was felt that a countryside code of conduct was needed for adoption across the whole Falklands and this was produced in 2000 and adopted by the government. It is now given to every visitor, available on every coach, in every guest-house or hotel, in every lodge and self catering, and in most of East Falkland, is now on all the farm gates that you pass on roads and tracks, so the coverage is getting better all the time.

Obviously the first point of contact for many visitors are their local guides and drivers who may take them out to certain sites such as Volunteer Point and only by increasing the knowledge and awareness of these guides are you going to be able to influence how the tourists themselves behave around the wildlife.

We have an entire day every year teaching on the accredited Tour Guides course and this year we actually took guides out into the field and showed the differences in behaviour when birds are stressed. A surprising number of people who had been guiding for several years before doing the course didn't know what to look for and were unaware of the dangers of possible erosion or collapsing burrows. Most were unaware of simple ecological basics regarding the breeding cycle, timing and varying sensitivity at different times of year such as chick rearing.

We also run specific courses for specific sites, such as Volunteer Point. This means that these guides who have passed the course can have reduced fees to enter the site, so benefits them as well, also meaning that they have a higher standard for the customer, who learns more and is less likely to cause disturbance when they arrive.

All of the information we give out is free, so it is available to everybody and they take as many leaflets etc as they want and hand them out to their tourists if they want. Because many of the guides are operating small businesses on their own, this provides them with a valuable resource which otherwise they would have to pay to have produced or simply not have.

Finally, one of the most effective ways in which we can operate is to support and recommend the best environmental operators. We promoted several of these in the guide book and we are also looking at forming links with some on our website, or allowing them to use our logo in their publicity.

Finally, at a stage where tourism pressure is extreme or a site is particularly vulnerable, we take direct action and initiate a warden service. Because much of the appeal of FI tourism is the remote aspect and the untouched environment, there is a fine line between intervention and control at sites without spoiling the 'feel' of a site, but in certain cases the need for more active protection outweighs these objections. Such cases are Gypsy Cove and Volunteer Point, which are unusual examples, simply because of their high accessibility and their popularity.

These cases need to be self-sustaining however, which at present is not the case. The wardens at Gypsy Cove are paid for by FIG who do not charge for access to the site, so this is a constant outlay for protection measures without any funding coming in.

To keep these programmes running it is essential to get support from the landowner, especially on private sites, and to make sure that there is some sustainable commitment to keeping them running over the long term. It may not be possible to warden Volunteer Point next year if no funds are raised. The present system works for this sensitive area - who keeps it going? Should this be the NGO, FIG or the landowner who is making £15 per head from 2,500 tourists?

What next for the Falklands?

Tourism is not going away –it is increasing worldwide and destinations considered 'safe' like the Falkland Islands are increasingly attractive.This leads to a serious potential for negative impact on wildlife and habitats if not managed properly.

The policies that the industry are based on have to reflect the sensitivity of certain sites and take into account environmental considerations, or it will not be sustainable and therefore the very reasons that people are coming to the islands will disappear.

How do we address the future?

Some of our recommendations and advice for the future will include the wide adoption of IAATO standards, which are currently not required within the Islands. Even IAATO vessels often lower their practice standards when they are here and expedition leaders sit around on beaches when tourists are at wildlife sites, simply because they are not obliged to operate to IAATO standards in the islands. Work is currently being undertaken to address this and we will be attending the IAATO conference in Seattle in May to request that this situation be reviewed and the Falklands be given the same environmental weighting as South Georgia and the Antarctic.

The government in the islands should adopt some form of legislation to ensure that these are being carried out. This should involve an observer system on some vessels, especially non-IAATO registered vessels, and limits should be placed on the numbers of vessels per day that can visit one site. Finally, increasing awareness for all tourists and operators – continuing some of the programmes that we already have and developing new ones. A second edition of the Visitors Guide is planned for release spring 2004.

We are working with the Falkland Tourist Board and private tour companies to produce a booklet for expedition leaders and vessel captains, advising best procedures for each site visited in the Falklands. This will improve the quality of guiding and all vessels operating around the Falklands. The Countryside Code is being produced in several different languages to make it more widely used by visitors

We are trying to implement a system of improved environmental briefings with the military. We produced a CD for them which is used at every arrivals induction day, but we hope to back this up with improved information and keep it updated regularly.

Finally, continuing and improving our programme of training tour guides and influencing best practice measures will probably have the biggest impact of all.

FIG must also ensure that funds and the will are available for appropriate research and sensitive development. It will require a governmental approach to ensure that all angles are covered and that individual sites have an island-wide standard of operation to reduce impact.

The Tourism Board is a growing operation but it does now have independence from mainstream government and the will to ensure sensitive and wise use development. The Environment Charter further backs this up and gives us an important tool to use to promote the need for this. The foundations have been laid for an environmentally sustainable tourism industry. The challenge now is to keep it that way.

Managing Nature Conservation in the Netherlands Antilles

Paul Hoetjes, Department of Environment of the Netherlands Antilles

Hoetjes, P. 2003. Managing Nature Conservation in the Netherlands Antilles. pp 108-110 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The Netherlands Antilles consists of five islands. Nature conservation is in the hands of NGOs. At first, nature conservation efforts were centralized; then the organisation splintered and spun apart, as the islands also drifted apart politically. Now nature conservation organisations are coming together again, a process stimulated and facilitated by the Central Government. In 2000 an Antillean Nature Conservation Initiative was established, also incorporating an Antillean Coral Reef Initiative. These cooperative efforts, comparable perhaps to a small scale OTCF, serve to coordinate and focus efforts, pool scarce resources, tap into new ones, and learn from each other. Common goals have been clearly identified and are slowly being realized. International initiatives and resources are more easily channelled to all the islands, and increased pressure can be brought to bear, to facilitate nature conservation on a local level. A few examples of successes as well as problems will be briefly touched upon.

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Netherlands Antilles

The Netherlands Antilles (enlarged and superimposed on the map, with red circles showing positions) consists of five islands, Bonaire and Curaçao in the Southern Caribbean, just off the coast of Venezuela, and Saba, St. Eustatius (Statia) and St. Maarten 900 km to the north-west. This large distance complicates communications and cooperation between the islands.

Nature Conservation

Each of the islands has at least one marine and one terrestrial protected area; the larger islands Bonaire and Curaçao have several terrestrial protected


cove beach – Curaçao


Coastal limestone cliffs – Curaçao

areas.

Management was centralized in one organization for all islands at first, but in the eighties this organization splintered and spun apart, as the islands also drifted apart politically.

Management of the protected areas now is in the hands of independent NGOs, one on each island, mandated by each island's government.

Advantages of Decentralization

There are a number of advantages in the decentralization of the management of protected areas. The local NGOs consist of island inhabitants, and have a local focus. Consequently there is a local sense of ownership of the protected areas. This results in greater local commitment and more local support for the protection of the areas.


Coral beach with lagoon – Curaçao

Disadvantages

There are however, definite disadvantages as well to the decentralization. The islands are small and isolated, with small populations. Because of this there is a lack of capacity, both in number of committed people available and in expertise. This sometimes results in the board of an NGO not allowing the executive manager or director of the NGO sufficient independence of action, hindering efficient management.

Because of the small scale the islands often have insufficient local funding sources, and insufficient potential for raising revenues. Because the islands are isolated it can be hard to acquire international funding.

A great disadvantage finally is the fact that the profile of an island is all-important for the acquisition of funding, and to stand out sufficiently is often a question of luck. Once you stand out you can raise more revenue from tourism, you become well-known internationally and can consequently get international funding more easily. The problem is getting noticed in the first place as one more, small island among many in the Caribbean.

Increased Cooperation

To off-set these disadvantages increased cooperation seemed logical and has been stimulated by the Environmental Department since 1996, when the first Nature Platform meeting was convened, bringing together all organizations from all islands to discuss the problems of nature conservation. Since then every two years these Nature Fora were organized resulting in joint planning of issues during these meetings and the ability to speak with


Elfin Forest - Saba

one voice as the Netherlands Antilles Nature Conservation Initiative (NANCI)

NANCI

The NANCI identified a number of priority issues, among others:
The establishment of a Trust Fund;
A Netherlands Antilles Coral Reef Initiative or NACRI, and
A joint biodiversity database.

Evergreen seasonal forest in "The Quill" Crater – St. Eustatius

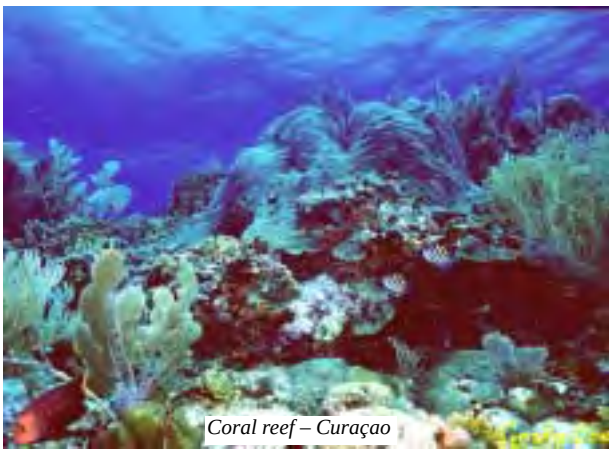
Trust Fund

The problem of funding was extensively discussed during the Nature Fora meetings. It was unanimously decided that the only sustainable way of funding the management and protection of the protected areas on the islands was by way of a Trust Fund or Endowment Fund: The fund would need to have a minimum capital that remains untouched, while the revenue raised by the capital would finance the basic infrastructure for management of the organizations on each of the islands. In a coordinated effort a financing plan was formulated, based on which each of the islands would receive a fair and basically equal share of the revenues of the fund for the management of one marine and one terrestrial protected area on each island

Nesting flamingos – Flamingo Sanctuary, Bonaire

NACRI

The Netherlands Antilles Coral Reef Initiative or NACRI was established by NANCI as a way to



Coral reef – Curaçao

focus jointly more attention on the coral reefs that are of great importance to the islands. It would also provide a connection to international efforts such as the ICRI, and in fact the Netherlands Antilles officially joined the ICRI as a direct result of the establishment of the NACRI. The NACRI would also be a vehicle for joint projects for all the islands, which should be easier to find funding for. The structure of the NACRI is bottom-up. It starts with all stakeholders of the coral reefs which meet regularly. So far all stakeholders except the fishermen have been involved. Although invited, the fishermen apparently require additional efforts to get solid involvement.

The forum of stakeholders identifies priorities and a plan of action and working groups are formed to implement actions through projects. Representatives of each of the working groups form a 'National Committee' supported by a secretariat presently hosted by the Environmental Department. This National Committee coordinates the funding and implementation of the different projects.

These were a few examples of how nature conservation on the different islands of the Netherlands Antilles is now managed in a cooperative manner to support and facilitate the work of the island based organizations. Thank you.

Collaborating through the Forum's web-database

Frances Marks and Mike Pienkowski, UK Overseas Territories Conservation Forum

Marks, F. & Pienkowski, M. 2003. Collaborating through the Forum's web-database. pp 111-119 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The web-data base (www.ukotcf.org) is a multi-functional management tool, and one of the main and most frequently used sources of information on UK Overseas Territories. It has three main elements:

1. The 'static' (conventional web-site) pages
2. Data-base - The main purpose is to find information on topics easily. It has the ability to save work and make the best possible use of this work in every possible way as it can be used many times and in many different ways.
3. Discussion Group facility - This facility is already available and has the potential to be used as a remote 'think-tank'. Although not yet fully implemented, it potentially complements the data-base. The database readily stores information that can be easily accessed later, whilst the discussion group is more suited to current exploration of ideas.

The data-base was designed to meet the frequent requests to the Forum to set up a system which would share information in a structured way and allow information entered once to be accessed for various purposes. These are important given the dispersed nature and work overload of the users concerned.

The database is designed in three tiers:

1. Any person with a password and basic training can access the database to add or edit information.
2. The data goes into a holding area. This allows for any queries, corrections and safeguards put in place by the second role, the administrator. Additions and alterations are not viewable by the general public until after verification by the Forum.
3. Thirdly the data goes public and can be accessed by anyone

Modules of the Database:

Conservation Priorities: These were the conservation priorities that the Territories themselves developed in the mid 90s. Now on the database, they can be reviewed and updated. This is effectively a forerunner of the Environmental Charter process, and provides a context in which to develop project proposals.

***Projects Module*:** This allows for projects to be developed and followed from the first ideas, through to the project proposal, and then allows for their progress to be monitored.

***Funding Sources Module*:** The module provides a place for potential funding sources interested in UKOTs to be recorded. This is not as large a set of data as we would like!

***Information Sources Module*:** This versatile module allows for any information that does not fit into the other four categories.

***Sites and Topics Module*:** This has recently been added and its design benefits from what was learned using the earlier modules. For example, data entry involves fewer fields and it has more capacity to include pictures. It helps make these known and assist in their conservation, monitoring and management. It will also help to exchange knowledge and expertise on issues, protection and management, so that we learn from each others' successes and problems;

The success of the database is dependent on information being put on the database by as many people as possible.

Frances Marks, UKOTCF Coordinator, 15 Insall Road, Chipping Norton, OX7 5LF, UK. fmarks@ukotcf.org

Dr Mike Pienkowski, UKOTCF Chairman, 102 Broadway, Peterborough PEI 4DG, UK. pienkowski@cix.co.uk

Introduction

WWW.UKOTCF.ORG is not just another website. It is one you should all remember as it is your website.

It is frequently accessed. Some checking last week showed it at the top of the search engines for Google and yahoo in this area. More and more emails and calls are coming from people who say "I found your details on the website".

The web/data base (www.ukotcf.org) is a multi-functional management tool, with three main elements:

1. ***The Static pages*** **-** Keeping people updated on events and links to member organisations and the UKOTs. The Forum's web site is one of the main sources of information on UK Overseas Territories

2. ***Data-base*** **-** The main purpose is to find information on topics easily. It has the ability to save work and make the best possible use of this work in every possible way as it can be used many times and in many different ways.

3. ***Discussion Group facility*** **-** This facility is already available and has the potential to be used as a remote 'think tank'. Although not yet fully implemented, it potentially complements the data-base. The database readily stores information that can be easily accessed later, whilst the discussion group is more suited to current exploration of ideas.

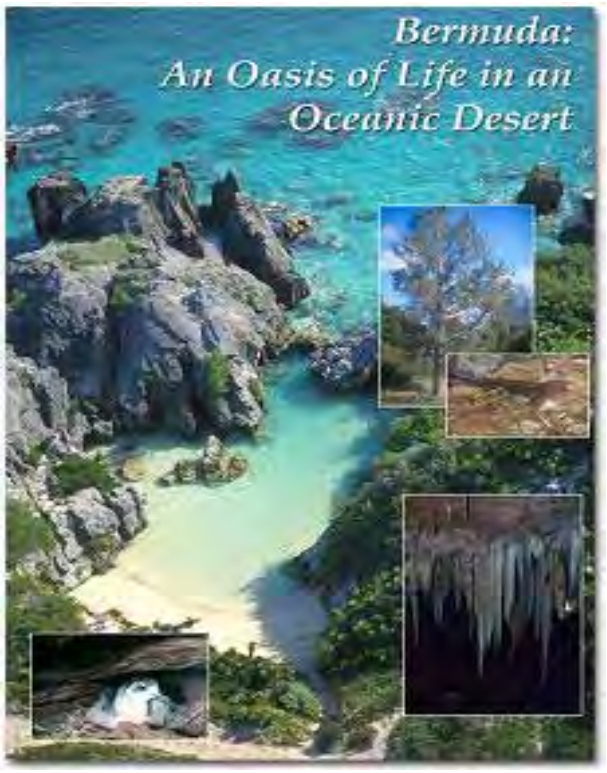
Static pages

The "static pages" (i.e. conventional web-pages, rather than database) include a wide range of material for sharing. For example, they draw attention to (and in some cases hold copies of) certain publications, information about the Forum and its member organisations (with links to their web-sites for more information) and information about the UKOTs.

New or important events can be flagged up on the home page of the website. A link to the details of this conference were there for many months, updated as arrangements settled. Many of you will have already been to the website and either downloaded the registration form or the conference

programme.

The website has a facility to store (usually in pdf form) publications, thereby making key but not conventionally published material (such as management plans) widely and immediately available. *Forum News* 22 was on the website before it got into the Christmas post. It also has the added bonus of being in colour on the website. Other publications include back copies of *Forum News*, Annual



Reports and the Proceedings from the conference that was held in Gibraltar in 2000. After this conference the proceedings will be published on the web pages.

If you had wanted to find out more about Bermuda, you could have gone to the site, clicked Territories, and then Bermuda in the side-menu. The pictures and text that illustrate Bermuda on the Forum's display boards would appear, with information on conservation issues in Bermuda and links to conservation organisations in Bermuda.

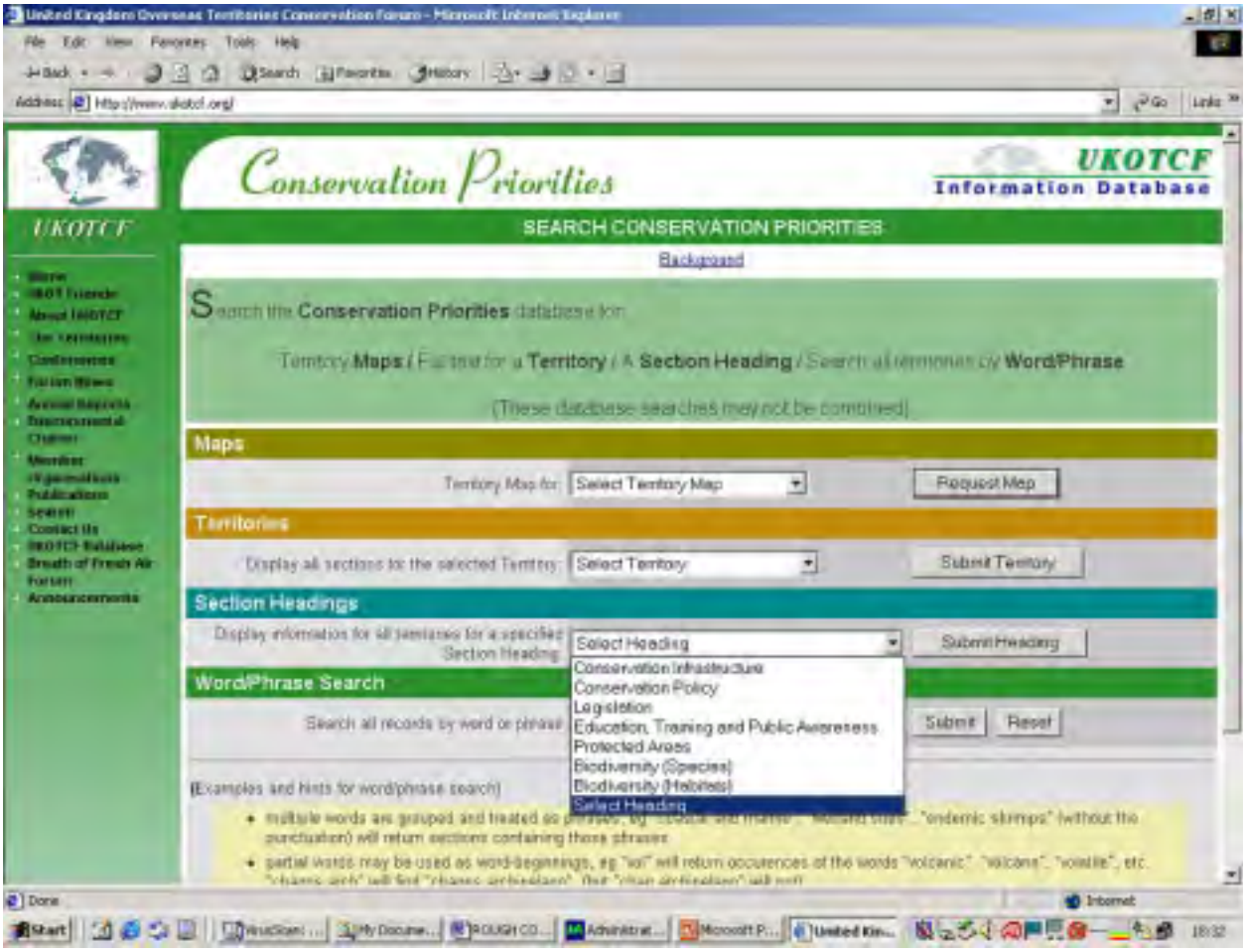
Accessing the Database

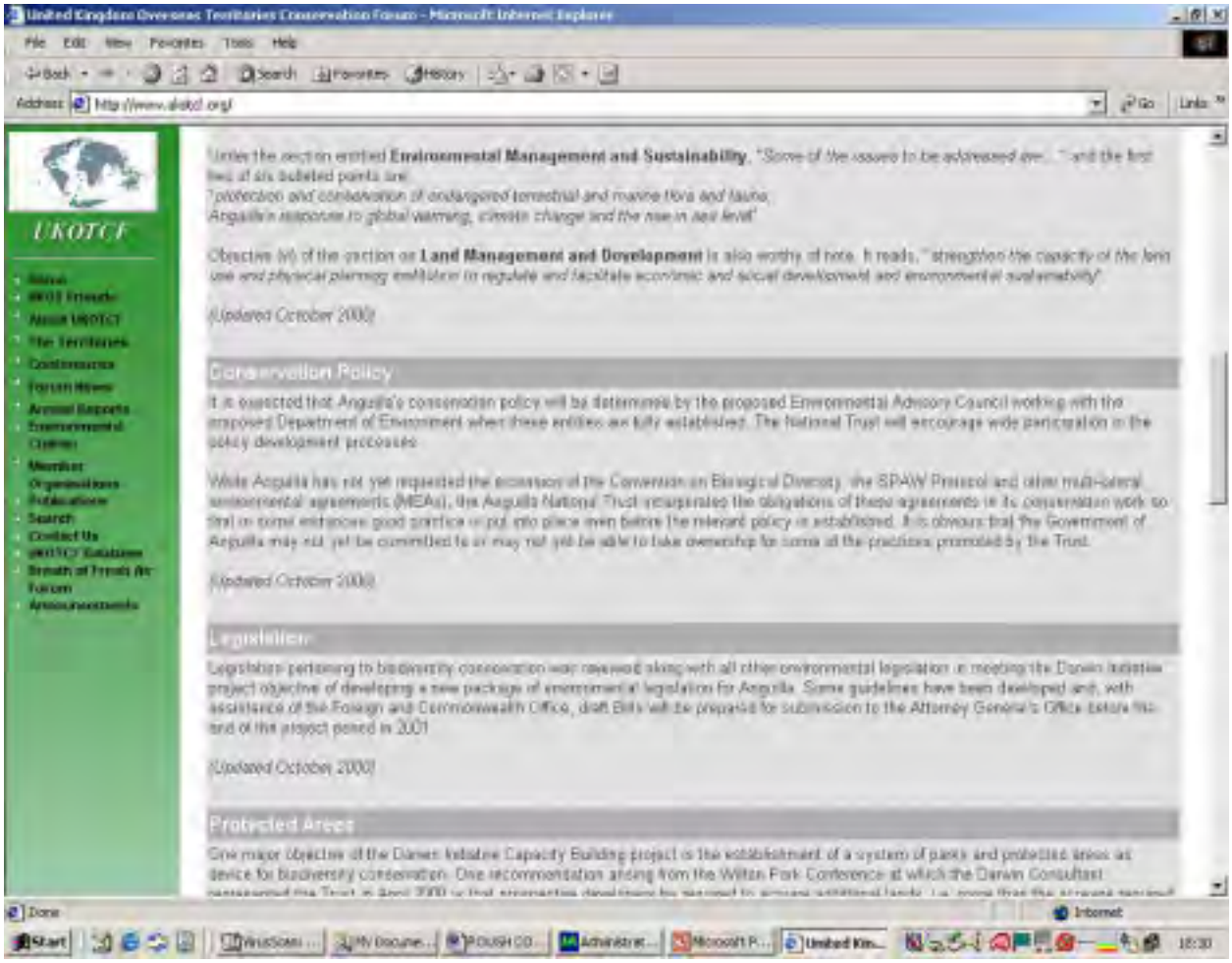
The data-base was designed to meet the frequent requests to the Forum to try to set up a system to find a way of sharing information in a structured way given the dispersed nature of the users concerned. Important elements in its design (following wide consultation) were:

- the need for information on conservation in the UKOTs to be made available once, and then be accessible for other purposes without overworked personnel in the UKOTs or their supporting bodies elsewhere having to be bothered again
- the need to make available to the UKOTs information that they may need only infrequently, but for which there is scattered experience
- the need for all users to "own" the database, i.e. to be able to enter and access information, rather than relying solely on some remote, centralised office.

To meet the last point, he database is designed in three tiers:
Any person with a password and basic training can access the database to add or edit information. Please contact Mike Pienkowski (pienkowski@cix.co.uk) for guidance on this.
The data goes into a holding area. This allows for any queries back to the person entering the data (usually for clarity), corrections to be made and safeguards put in place by the second role, the system administrator. Additions and alterations are not viewable by the general public until after this verification by the Forum. Thirdly the data goes public and can be accessed by anyone

The success of the database is dependent on information being put on the database. It is your database. There is no need for an inward groan – "that





means more work for us – I have not got the time to write anything special for the database". We can all empathise with this character here – piled high with paper work, not even a computer in sight. We want to emphasise that you probably already have everything that needs to go on the database already written. It is mainly a matter of copy and paste, and getting into the habit of connecting to the database.

The database itself comprises several modules:

- Conservation Priorities
- Projects
- Funding Sources
- Information Sources
- Sites and topics

Modules of the Database

To enter the database to search it, click UKOTCF database on the side-menu at www.ukotcf.org. This will lead you to a page which allows you to select the module that you want. This in turn leads to some background information on that module. Then click Search, which leads to a page in which you can enter the search parameters (see screen on previous page for an example in Conservation Priorities module).

Conservation Priorities

These were the conservation priorities that the Territories themselves developed in an exercise conducted by the Forum in the mid-1990s. Now on the database, they can be reviewed and updated by the Territory concerned - and some have done this. This is effectively a forerunner of the Environment Charter process, and provides a context in which to develop project proposals.

The search in this module can be on the basis of Territory, subject heading, or for the occurrence of any words, phrases or strings of characters.

The screen at the top of the previous page shows part of the various subects for Anguilla.

Projects Module
This allows for projects to be developed and followed from the first ideas (for example, to pull in ideas and collaborators as to how an issue might be addressed), through the project proposal (for potential funders), to keeping track of the project (allowing progress to be monitored, and eventually others to be aware of the results).

The headings of this module were actually set to match the original ones set up in FCO's Environment Fund for Overseas Territories, but the latter changed its headings just after. Nevertheless, any relevant informmation can be fitted into appropriate free-text modules of the module.

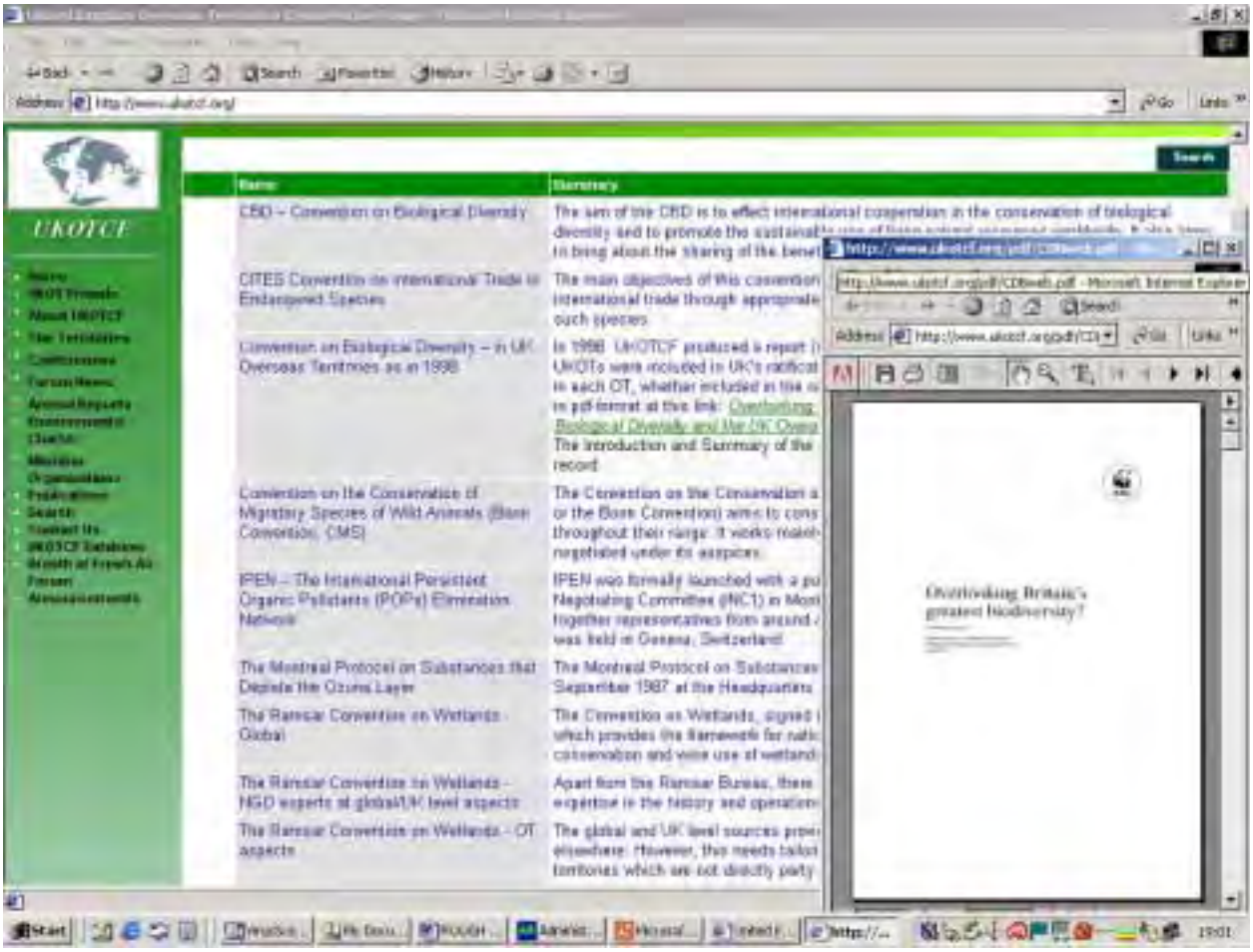
The example screens show firstly (below) part of the list of projects resulting from a search in this module for Environmental Educaton projects. Clicking on the title or summary of one of these gets to the details of that project. The other two screens shown (next page) give the results of clicking on Turks & Caicos National Trust's FCO- and UKOTCF-supported primary school Our Land, Our Sea, Our People project.

Funding Sources Module
The module provides a place for potential funding sources interested in UKOTs to be recorded. For instance there are details and links for the Darwin Initiative, the former Environment Fund for Overseas Territories of FCO, and various NGO small grants programmes, e.g. RSPB or British Ornithologists' Union. This is definitely not as large a set of data as we would like - but that is a function of the limited funding available to UKOTs. Additions are welcome to this module as well as to the others!

The Funding Sources module is actually a special sub-set of the Information Sources module.

Information Sources Module
This versatile module allows for any information that does not fit into the three previous, and the following, categories.


UKOTCF
Information Database
Project Details
Search
Our Land, Our Sea, Our People
Title:
Our Land, Our Sea, Our People
Purpose:
Objectives:
Means:
Start Date:
Planned Completion Date:
Stakeholder Analysis:
Turks & Caicos National Trust
TCI Education Department
schools
UK Overseas Territories Conservation Forum
Critical Assumptions:
Wider Significance:
Total Cost Amount(UKS):
33188
Amount Request. Amount(UKE):
0
Financial Profile:
£28,188 received from Foreign & Commonwealth Office
Results:
Introduction to birds
National Parks
Wetlands
Coral Reefs
Seagrass beds
Mammals
Reptiles and Amphibians
Plants and plant communities
Our People
Issues
Other Information:
The programme will continue, as part of the TC National Trust Environmental Education programme
FCO Environment Command Programme Budget (AUSPO
(Information sources: AUSPB Project Proposal, update by TC National Trust 2000)
Summary:



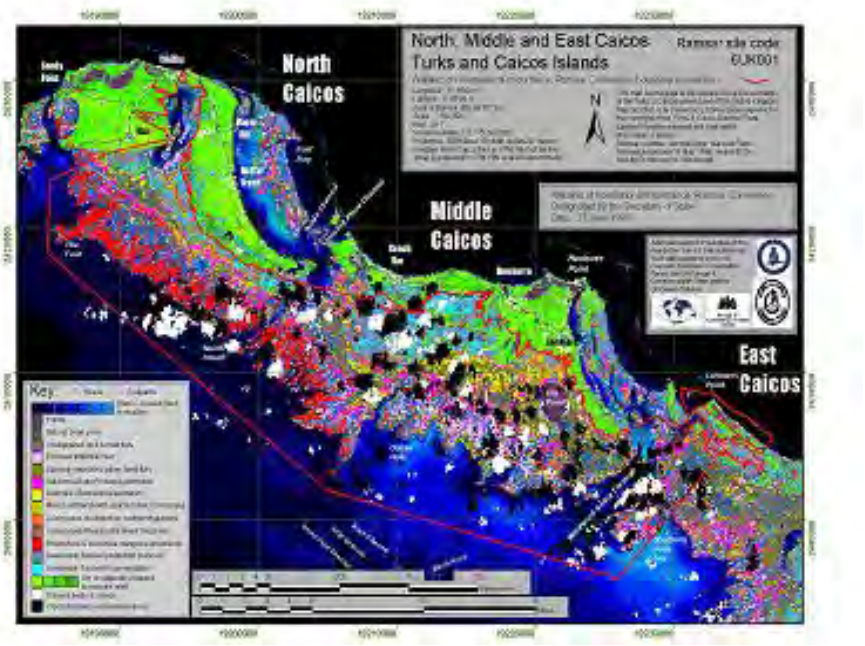
The example screen (above) shows part of the initial results of a search in this module for International Conventions. The inset illustrates the storing of publications on the database noted earlier. In addition to the link to the details for a particular entry, the summary - as well as other fields in the full entry - can include (as here, highlighted in green) links to such publications. Clicking the green resulted in opening a pdf window to the Forum's 1998 review of the implementation in the UKOTs of the Convention on Biological Diversity.

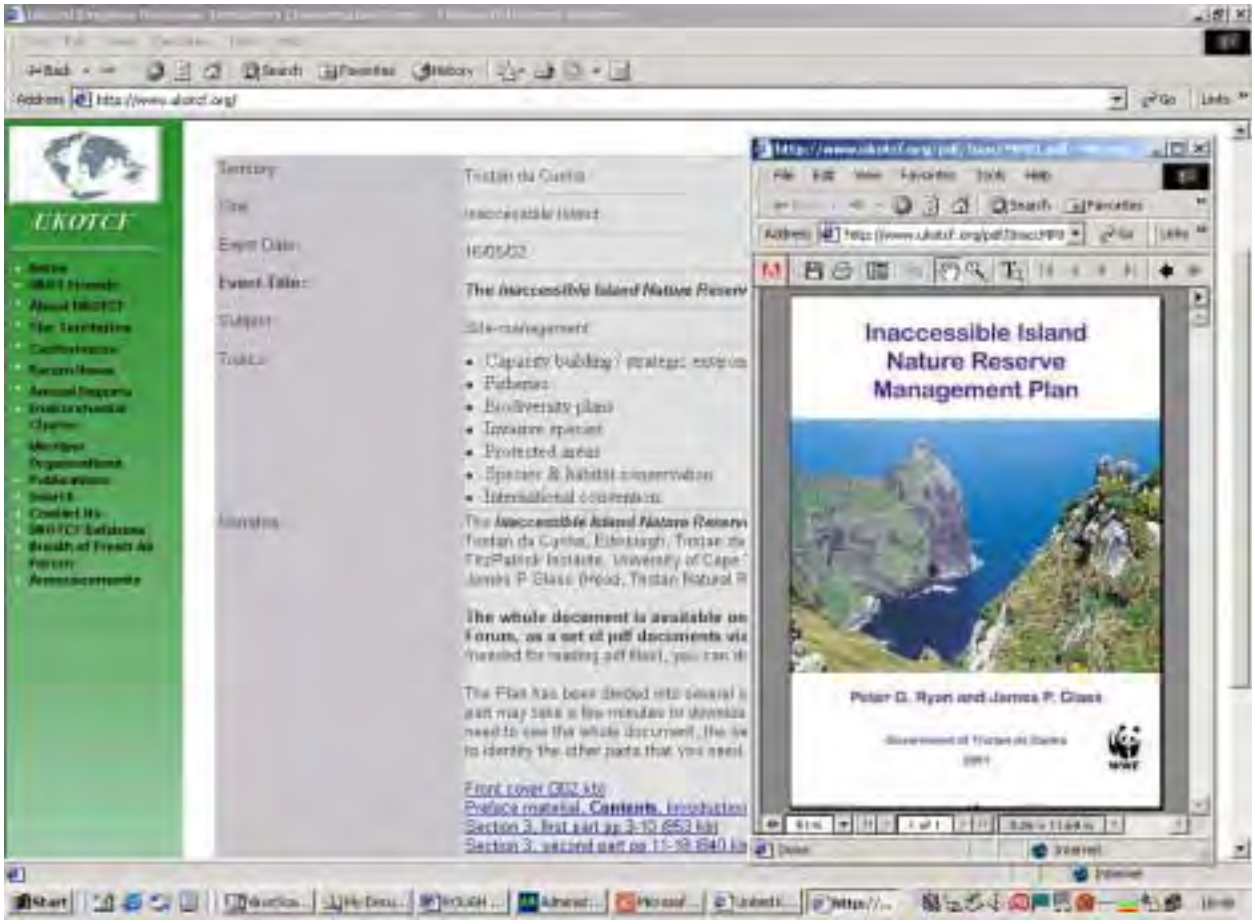
Sites and Topics Module

This has recently been added and its design benefits from what was learned using the earlier modules. For example, data entry involves fewer fields and it has more capacity to include pictures (for example the map here of the Ramsar site which is the subject of Ethlyn Gibbs Williams presentation in the next session).

This module is not just for protected areas but also other areas of importance, to help make these known and assist in their conservation, monitoring and management. It will also help to exchange knowledge and expertise on issues, protection and management, so that we learn from each others' successes and problems.

Unlike the other modules, which tend to contain a





single updatable record for each project, funding source or whatever, this module can have an effectively unlimited number of 'events' for each site. It is therefore usually expanded by adding another event to the relevant site. The screen image shown is part of an event for Inaccessible Island, Tristan da Cunha. This 'event' was the production of the management plan. The plan itself (inset) is accesssed by clicking the colour-highlighted part of the main entry.

Some final thoughts

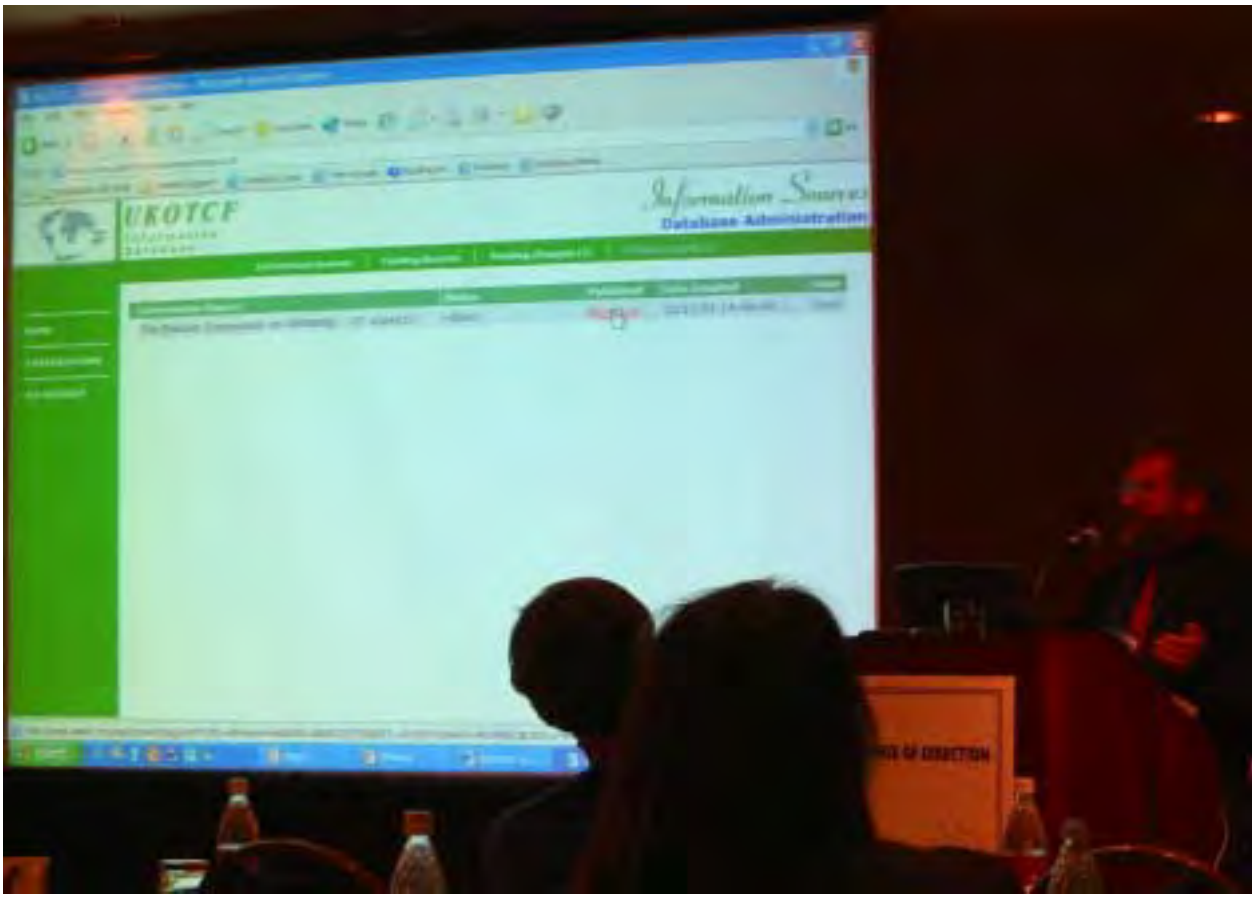
We need to reiterate that the success of the database is dependent on information being put on the database by as many people as possible. It is your database. We are happy to help give some basic training and issue you with passwords (contact pienkowski@cix.co.uk). We want you to feel more like this character – cool calm and collected with a clear desk (unlike Mike)!

We are not asking you to do another major task in your busy day. There is some work involved but, after the initial frustrations which seem inevitable whenever one uses a piece of unfamiliar software, it soon becomes easy, usually by electronic cutting and pasting from existing documents. We will not try to describe this here, because it will sound more complicated than it is. However, those present at the conference witnessed our unscripted use of Bermuda Audubon Society's newsletter to add information to several modules. Newsletters, project proposals and much other existing material can readily be lifted and popped into the database. For larger documents (such as the management plan noted above), please email to consult how most easily to upload these.

At present emphasis, with our limited resources, is on “populating” the existing modules with information, but in the future there is the potential to add new modules (some of which have already been suggested by colleagues in UKOTs) providing funding can be secured.

Remember that to interrogate the database (as opposed to data entry), no password is required, anybody can do it. It is very easy with menus and easy to follow instructions at www.ukotcf.org.

One of the data-entry screens being explained (BP)



BVI National Parks Trust's computerised management system

Joseph Smith Abbot, BVI National Parks Trust

Smith Abbott, J. 2003. BVI National Parks Trust's computerised management system. pp 120-128 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Information requirements associated with National Trusts and similarly structured organizations are multidimensional and varied. Conservation-related organizations are called upon to manage natural and historical sites taking into account ecological and socio-economic factors which may have led (or to continue to lead) a resource to be in peril or to be improperly managed. Management must occur within the context of best biological/ecological information, adherence to solid management planning practices, fiscal prudence, the development of capacity to conduct daily operations and the ability to link on the ground activities to a great number of regional and international agreements governing natural or cultural elements of our environment.

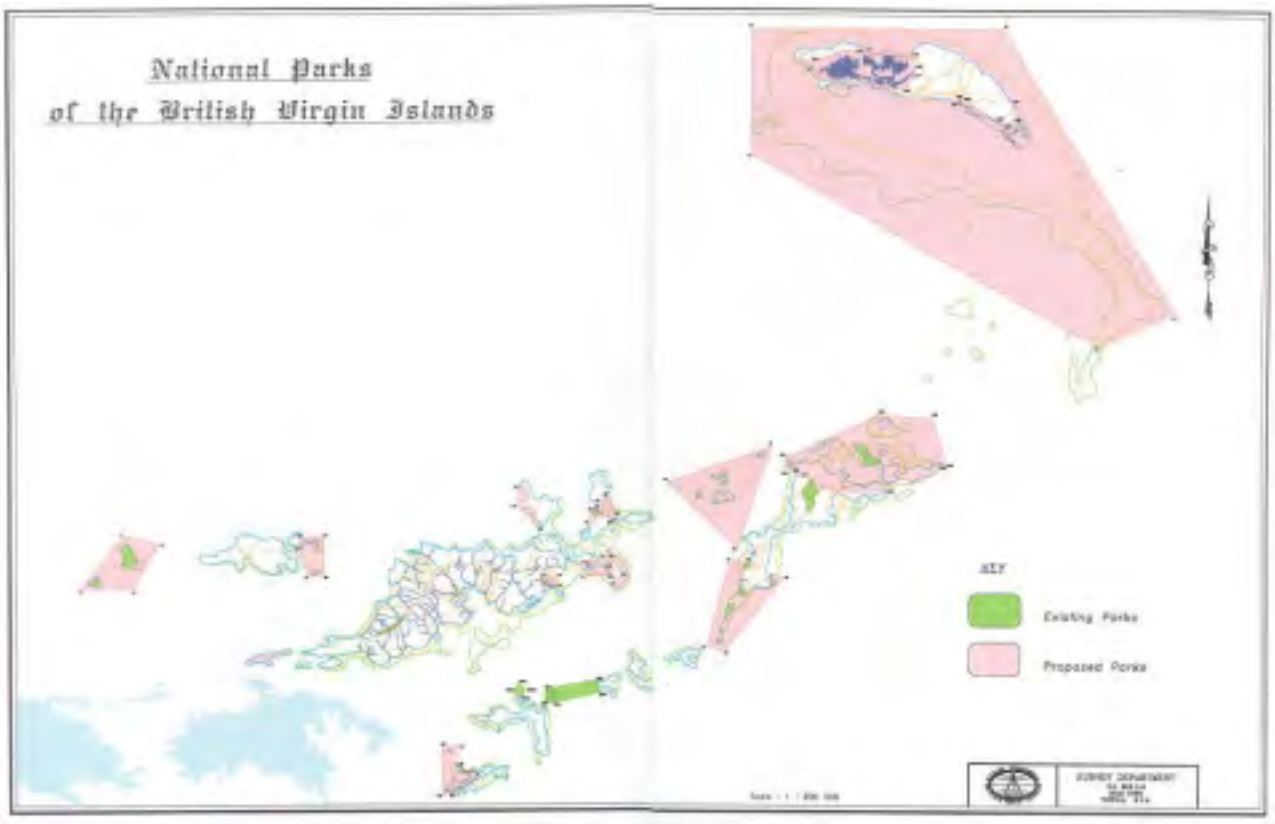
The management of natural/cultural, human and financial resources can only be facilitated via the creation of more comprehensive **management information systems** which account for the particular needs for the integration of biodiversity, socio-economic factors, historical attributes associated with properties, human resource management and financial information. Ultimately all of the information acquired through various planning exercises and day-to-day operational activities should be available to produce custom reports detailing contributions to the progress in attaining goals embodied in regional and international conventions. A strengthened network of Overseas Territories conservation-related organizations will emerge as they begin to harness the power of customized applications designed to manage information in an efficient manner. This presentation will summarize efforts undertaken by the British Virgin Islands National Parks Trust to create and test a custom-built management information system which accounts for variables impacting the operation of the organization.

Joseph Smith Abbott, National Parks Trust, PO Box 860 Road Town, Tortola, BVI. director@bvinationalparkstrust.org

Introduction

National Trusts and other similarly structured organizations manage natural and cultural assets of national importance and of tremendous biodiversity or historical value within a complex context of degrading ecosystems and dynamic human interaction within and without these areas. Often the rationale for setting aside an area of natural or historical significance is grounded in a relatively good understanding of the need to designate and protect a percentage of a country's total land or sea mass. To that avail, many countries have employed IUCN models and criteria for drafting System Plans, which identify networks of areas in need of protection and legal designation. IUCN based System Planning tools were employed in the BVI as early as 1979 to rationalize the inclusion of areas of national importance in terms of biodiversity and cultural significance. The network of terrestrial and marine areas existing today is a testament to that process. Two iterative processes of review and update have taken place since (1986 and 2000) which have allowed for:

1. Further refinement of the rationale for site inclusion into a system of protected areas using the most up to date information on the biodiversity status or cultural values of an area;
2. Amalgamation of terrestrial and marine elements comprising more holistic ecological units; and,
3. An update of socioeconomic factors affect-



ing the ecological integrity of areas under our mandate and those that we seek to include within the system of protected areas.

The iterative process of review of the BVI System Plan continues to provide a solid basis for the refinement or creation of management plans for either individual or collective units of the network of protected areas. Moreover, all activities undertaken within the protected area network will stem from an assessment of principles contained therein.

Rationale for the Creation of a Custom Computer Application for the Management of Protected Areas in the British Virgin Islands

Effective management of national parks and protected areas require good baseline information, whether for terrestrial or marine areas of biodiversity or cultural value. Moreover, there is always the need to benchmark progress in the attainment of objectives and activities outlined in management plans, which are to be carried out within the protected areas. While great emphasis has been placed on the formulation of management or restoration plans and baseline information through inventories or ecological assessment for a great number of areas represented in Overseas Territories and throughout the world, lesser emphasis has been placed on the capture of information related to day-to-day activities related to the management of protected areas with the exception of a few notable areas.

The revolution in computational processing capacity and iterative refinement of business models for profit making ventures has not reached the large number of conservation related organizations and therefore, we are not fully benefitting from technologies currently available to improve the operational side of our organizations. A discussion of management models pertinent to the type of work that National Trusts and other conservation related organizations undertake traditionally centre around the realms of management planning, biodiversity conservation management or geographic information systems. In some instances, integration of biodiversity and geographic information is possible and models to capture such information are highly developed; however, tools, which capture business processes and other types of information relevant to our context, do not exist. Computer applications or custom-designed software which may aid in the proper management and understanding of our operations are less developed therefore, shortchanging great opportunities available to capture and share valuable information which may contribute to a discussion of best management practices related to the management of biodiversity or cultural assets. National Trusts and related

conservation organizations will increasingly require better ways of documenting information in databases which record business processes, biodiversity, geographic and cultural attribute information.

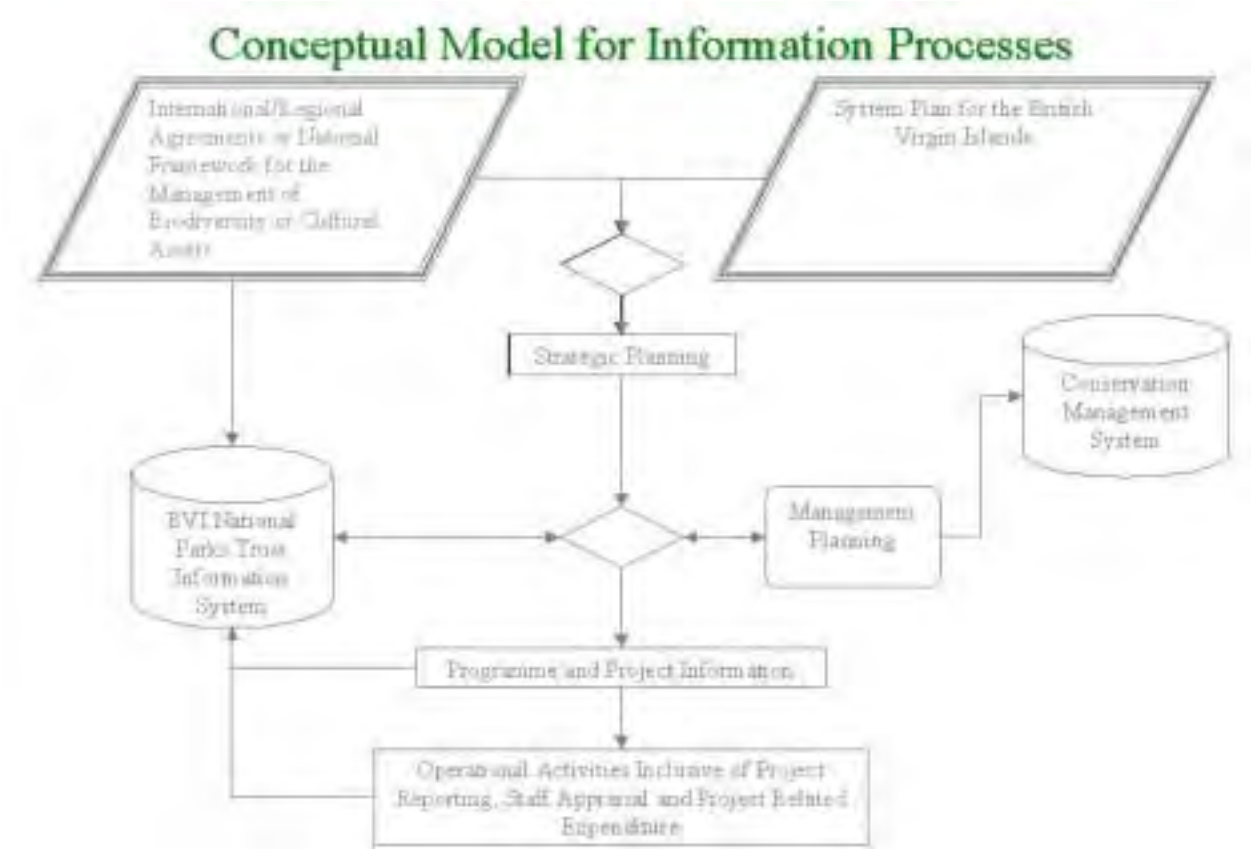
Central questions which must still be answered and are related to strategic and operational issues include:

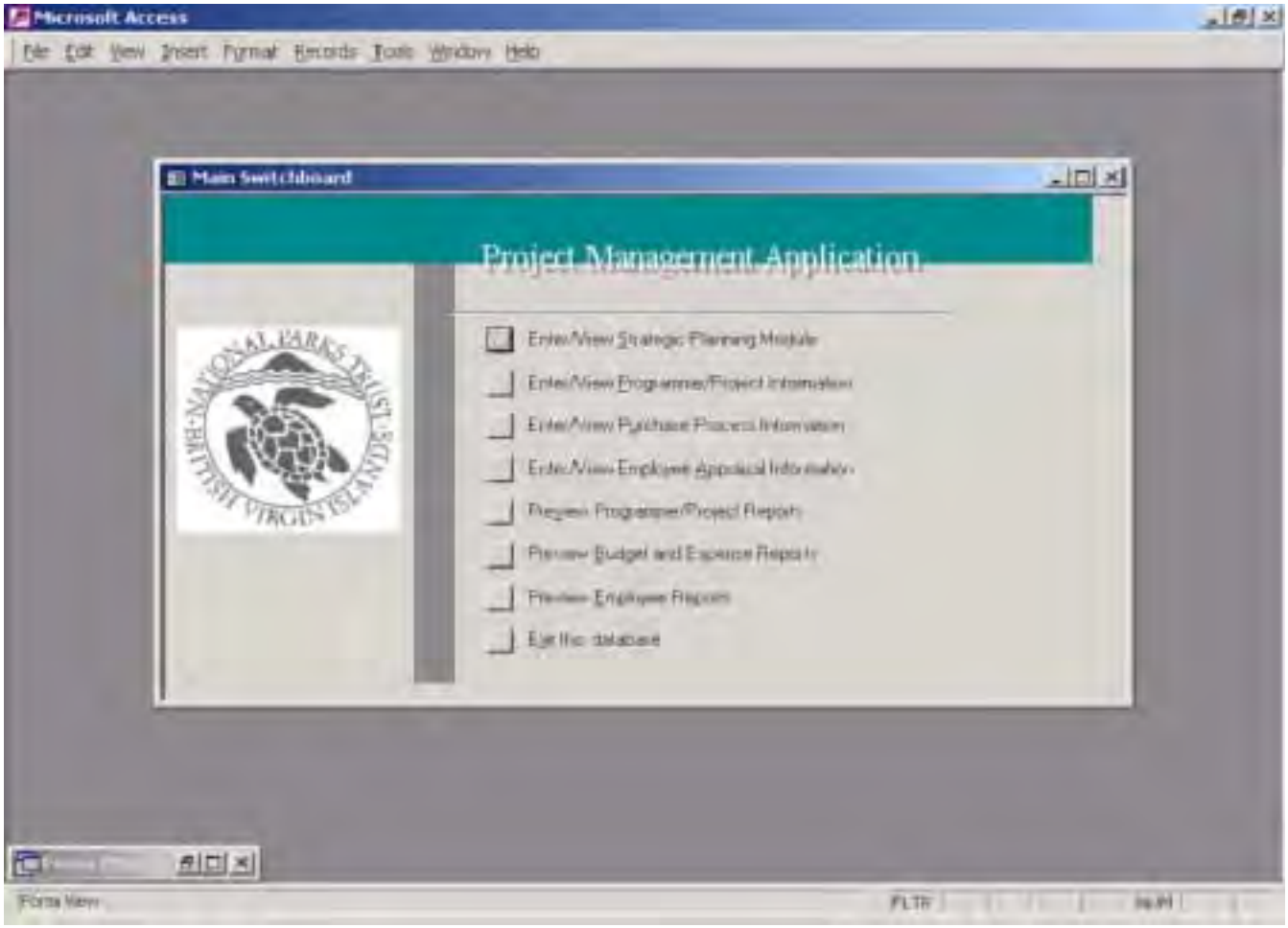
1. How is the work undertaken by the Trust under management plans and other working documents linked back to principles embodied in the Convention on Biological Diversity, Ramsar, the Cartagena Convention's protocol on Special Protected Areas for Wildlife, the St George's Declaration, individual Environment Charters produced under the White Paper and so many other international, regional and national frameworks for action without being overwhelmed by the entire exercise?
2. What tools are available to document and track the progress and performance of a myriad of programmes and projects?
3. How can institutions effectively document daily activities, which support the formulation of reports on progress, associated with the attainment of principles within conventions and other agreements or frameworks and allow for the awareness and feedback at a number of organizational levels?

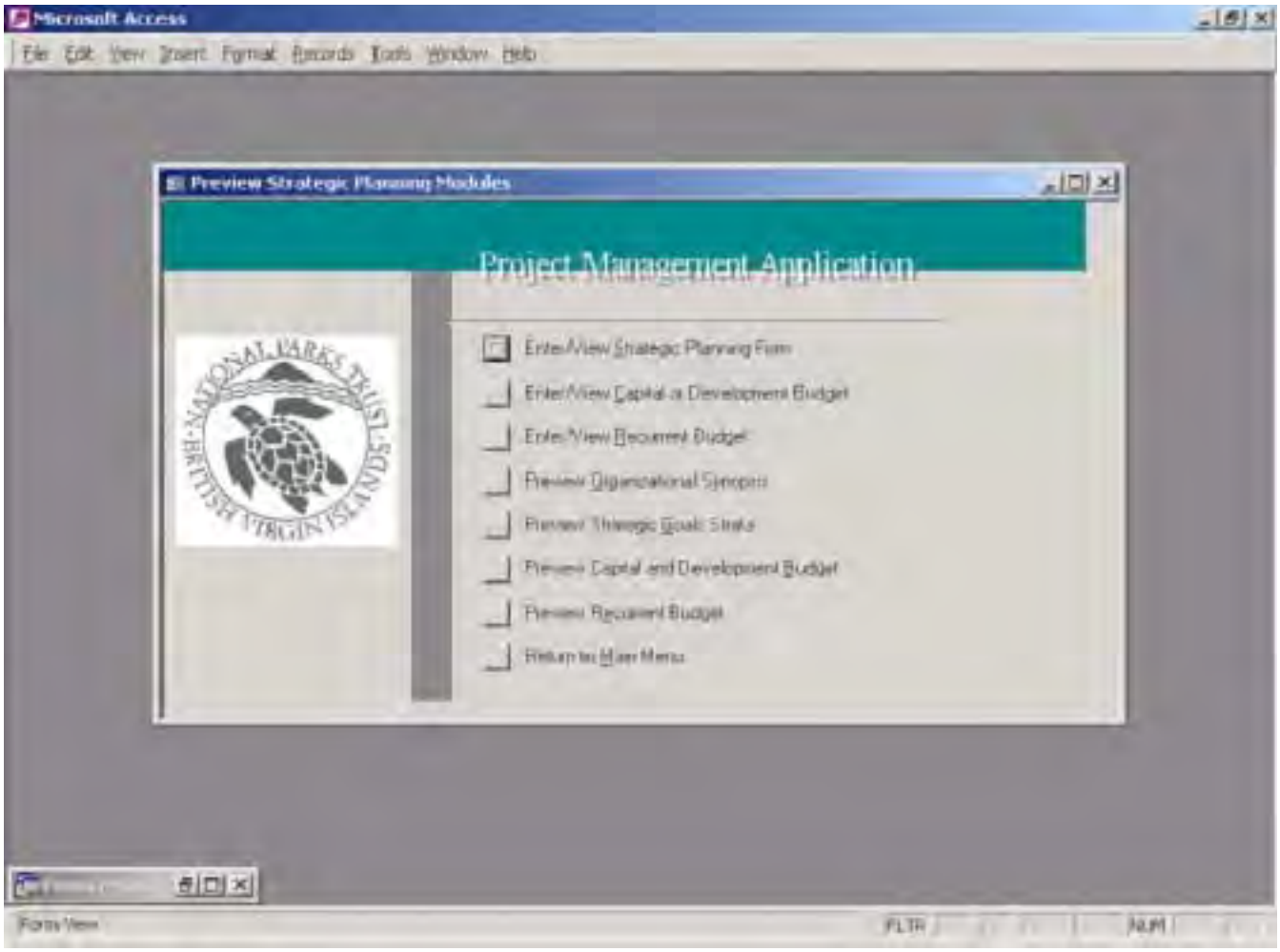
This deficiency poses tremendous challenges to managers and practitioners who seek to understand in a dynamic way, events that are taking place within individual components of the network of protected areas and their institutions. Information on how daily factors impact the integrity of an area and the efficacy of management regimes applied to ameliorate stress or potential loss of biodiversity is critical in this age.

It is against this backdrop that the BVI National Parks Trust embarked on an examination of methods to institutionalize and document daily processes related to the capture of activities undertaken within the network of protected areas while making the appropriate linkages to external frameworks of law or policy affecting our operation. The Trust has focused on the use of databases and custom-designed applications which allow for several layers of individuals to interact with, and be responsible for the acquisition of knowledge related to managed resources. The application is modular by design with layers of information captured in the Management Information System Trust including:

1. The applicability of international, regional and national environmental frameworks to the work undertaken at the Trust;




Microsoft Access
File Edit View Insert Format Records Tools Window Help
Main Switchboard
Project Management Application
Enter/View Strategic Planning Module
Enter/View Programmes/Project Information
Enter/View Purchase Process Information
Enter/View Employee Appraisal Information
Preview Programme/Project Report
Preview Budget and Expense Report
Preview Employee Report
Exit the database
Form View
FLTR
NUM


Microsoft Access
File Edit View Insert Format Records Tools Window Help
Preview Strategic Planning Modules
Project Management Application
Enter/View Strategic Planning Form
Enter/View Capital or Development Budget
Enter/View Recurrent Budget
Preview Organizational Synopsis
Preview Strategic Goals Status
Preview Capital and Development Budget
Preview Recurrent Budget
Return to Main Menu
Form View
FLTR
NUM

2. The documentation of strategic plans;
3. The documentation of management plans (using the Conservation Management System developed by the UK Countryside Management);
4. The documentation of programme and project structure; and,
5. The iterative documentation of daily and annual activities such as update reports on implementation progress, financial expenditure and staff contributions towards the attainment of programme and project goals, objectives and activities.

The BVI NPT Management Information System was developed using Microsoft Access, a relational database, in order to keep costs and application development complexity down. Initial expenditure entailed training in application development using Microsoft Access Software. All development was conducted within the organisation with individuals contributing to the review of management models expressed in the application and vetting ease of use of outputs produced. Overall development took place over the span of a year. Project management models employed by the BVI Government's Ministry of Finance and the Development Planning Unit of the same Ministry were employed to create portions of the database. Additionally, strategic planning methods employed by the U.S. National Park Service were used as a model for documenting the process at the Trust. Finally, a number of Human Resource models for appraising employees were explored to derive a consistent way of evaluating contributions to project implementation and their overall annual performance.

An introduction to the application exposes the user to a main dialogue box (screen at top of previous page) which allows them to choose to enter strategic plan, programme or project, financial expenditure and appraisal information. Choosing the strategic planning module allows a user to decide whether components of the strategic plan, global programme expenditure estimates and organisational information for the period in question will be entered (screen at bottom of previous page).

Relevant organisational information to be entered (screen at top of next page) include: the mission and vision, a summary of primary objectives and a synopsis of areas of the System Plan to be implemented for the strategic period in question. Strategic planning spans a period of three to five years at the Trust. Other screens (bottom of next page) allow the user to plan according to goal categories, mission, long term and short-term strategic goals, enter a description of the objectives of a project in its broadest sense (top of page 126) and budget for programmes and projects (bottom of page 126).

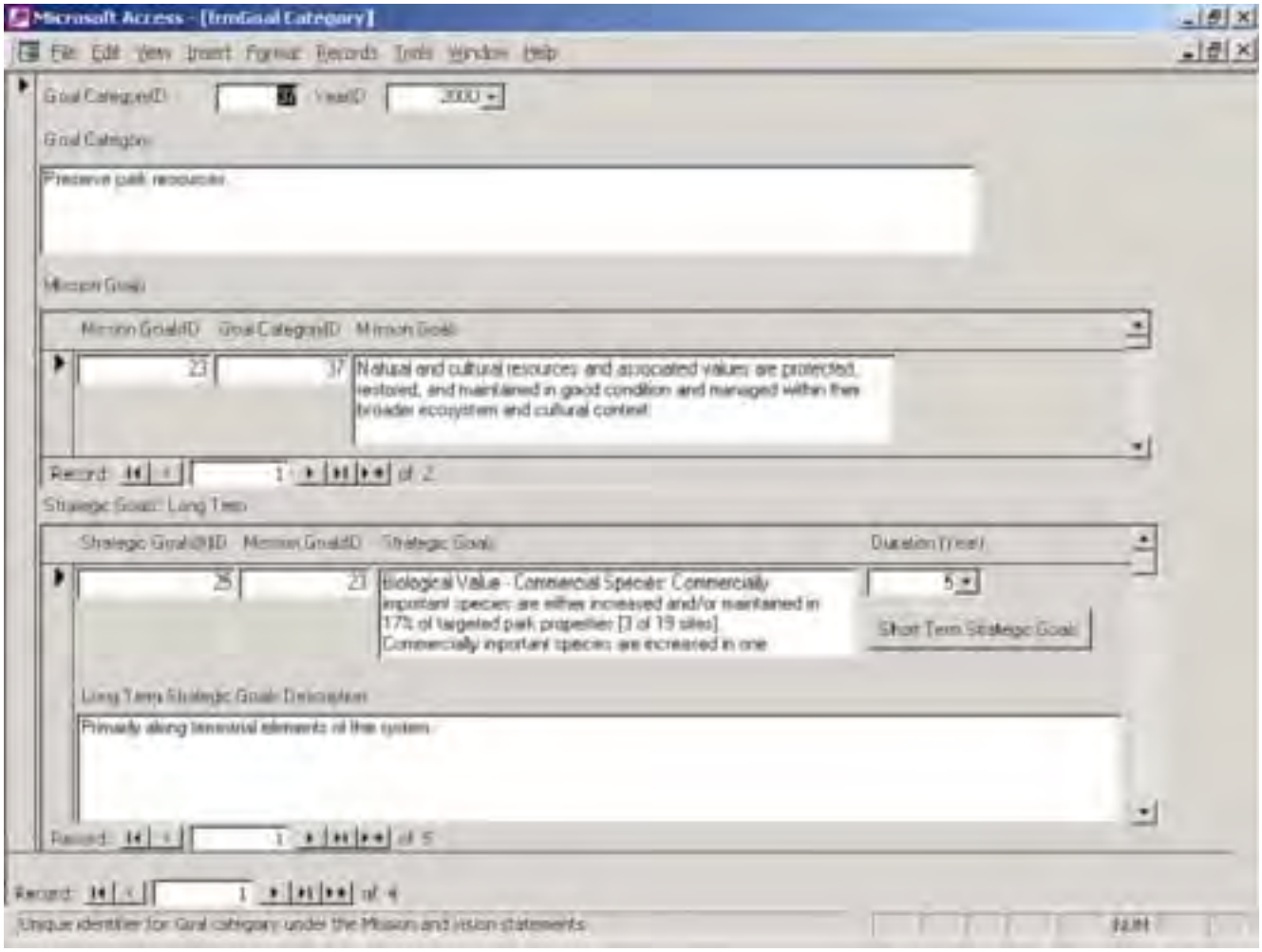
The project entry form allows users to further describe, justify and qualify constraints and risks associated with implementation (first part at the top of page 127). The form's second part (bottom of page 127) allows users to add more detailed information which may include the developmental, capital and recurrent elements of a project, specify individual goals and objectives for the project, budget and associate the project to individual components of the network of protected areas.

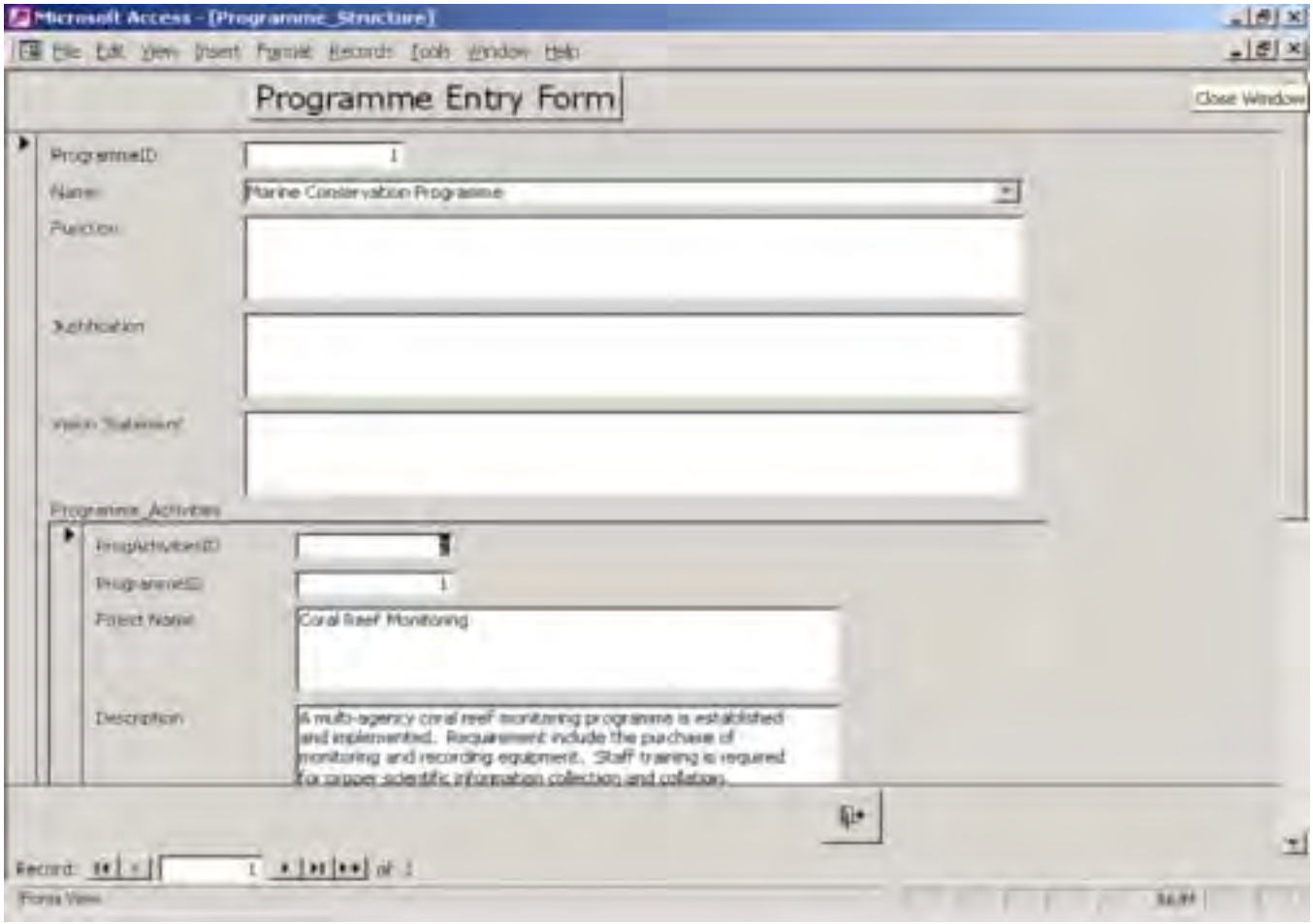
Finally (top of page 128), all projects can be directly correlated to policy instruments to which the Trust manages directly by inputting articles of convention or policy statements and describing their applicability to the Trust's work.

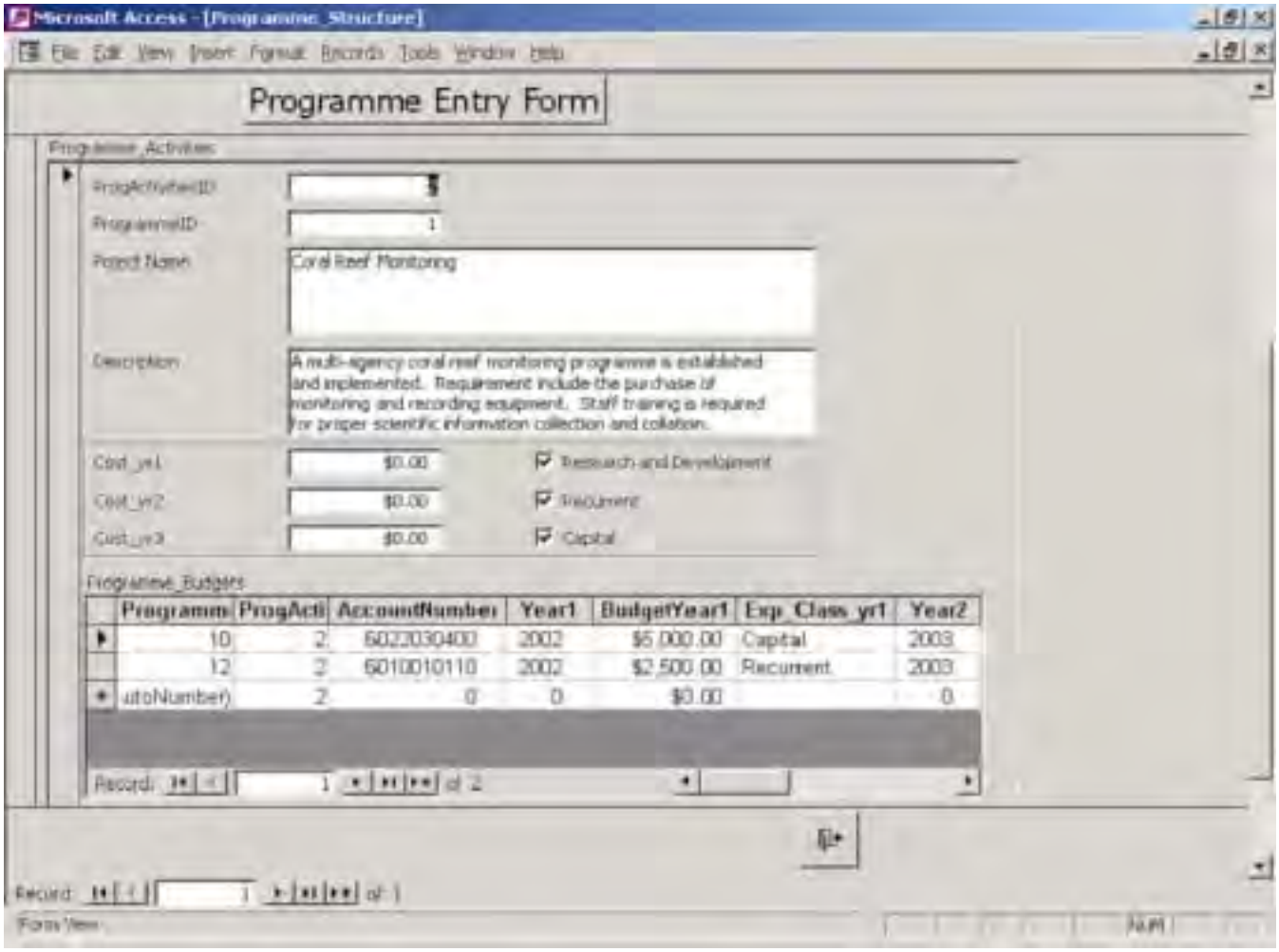
Ultimately, the Trust can provide information, standard and custom reports on its work, and their relationship to guiding policy documents (bottom of page 128).

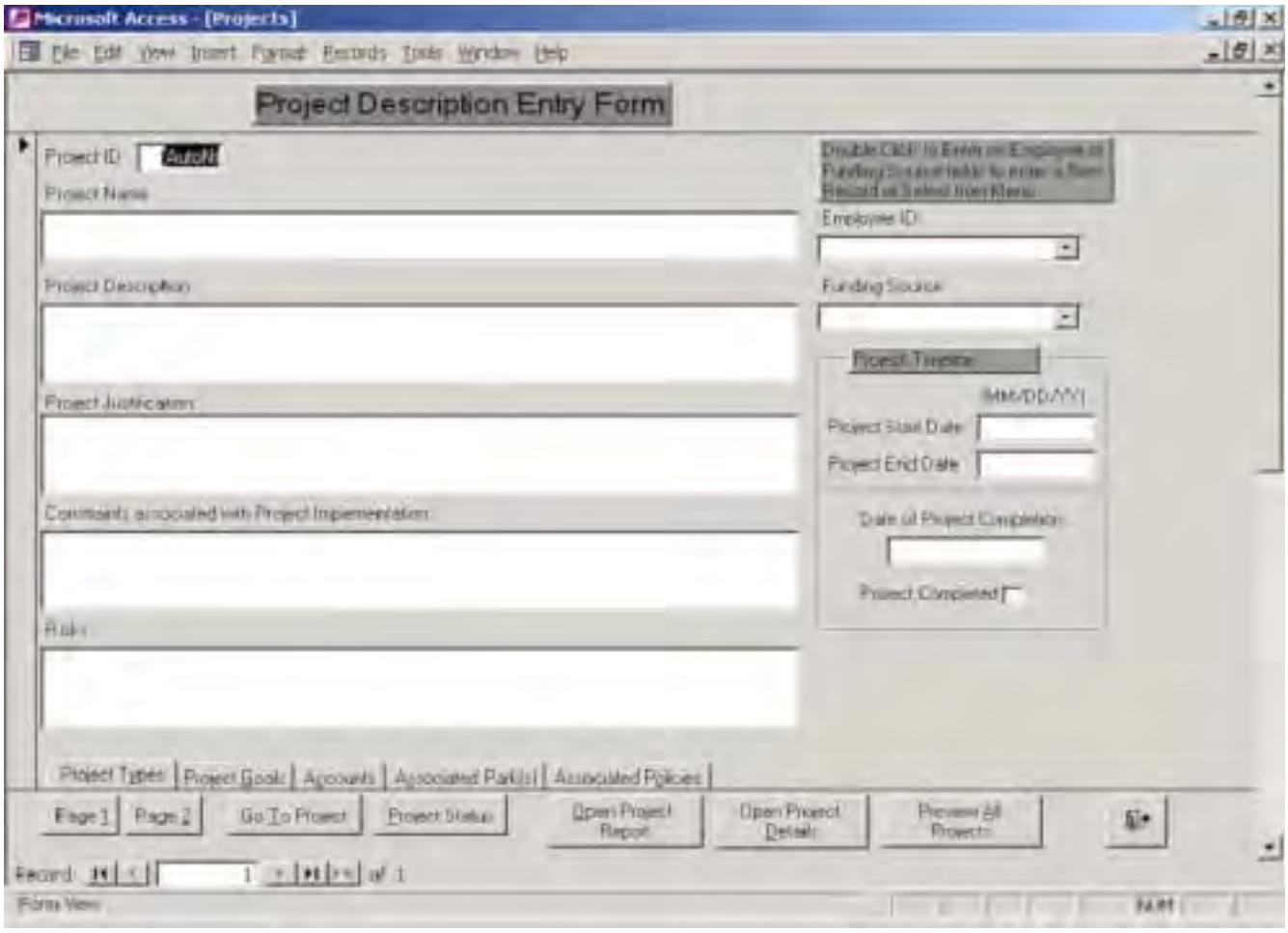
Information is as valuable an asset as any other that we are likely to manage. Institutionalizing the management of information is an exercise that is as equally challenging as overseeing other complex factors impacting the efficacy of our organizations. Our organizations will have to rely on tools which integrate several streams of data and information to increase our understanding of the areas, species and socioeconomic context in which we operate. Therefore, effort should be expended in further refining existing applications which document biodiversity, geographic, project management, human resources and financial information. The ability to document planning and implementation exercises using relational databases and computer applications will continue to strengthen the network of overseas territories, as capacity will be augmented through the more efficient way of managing information and therefore, our organizations.

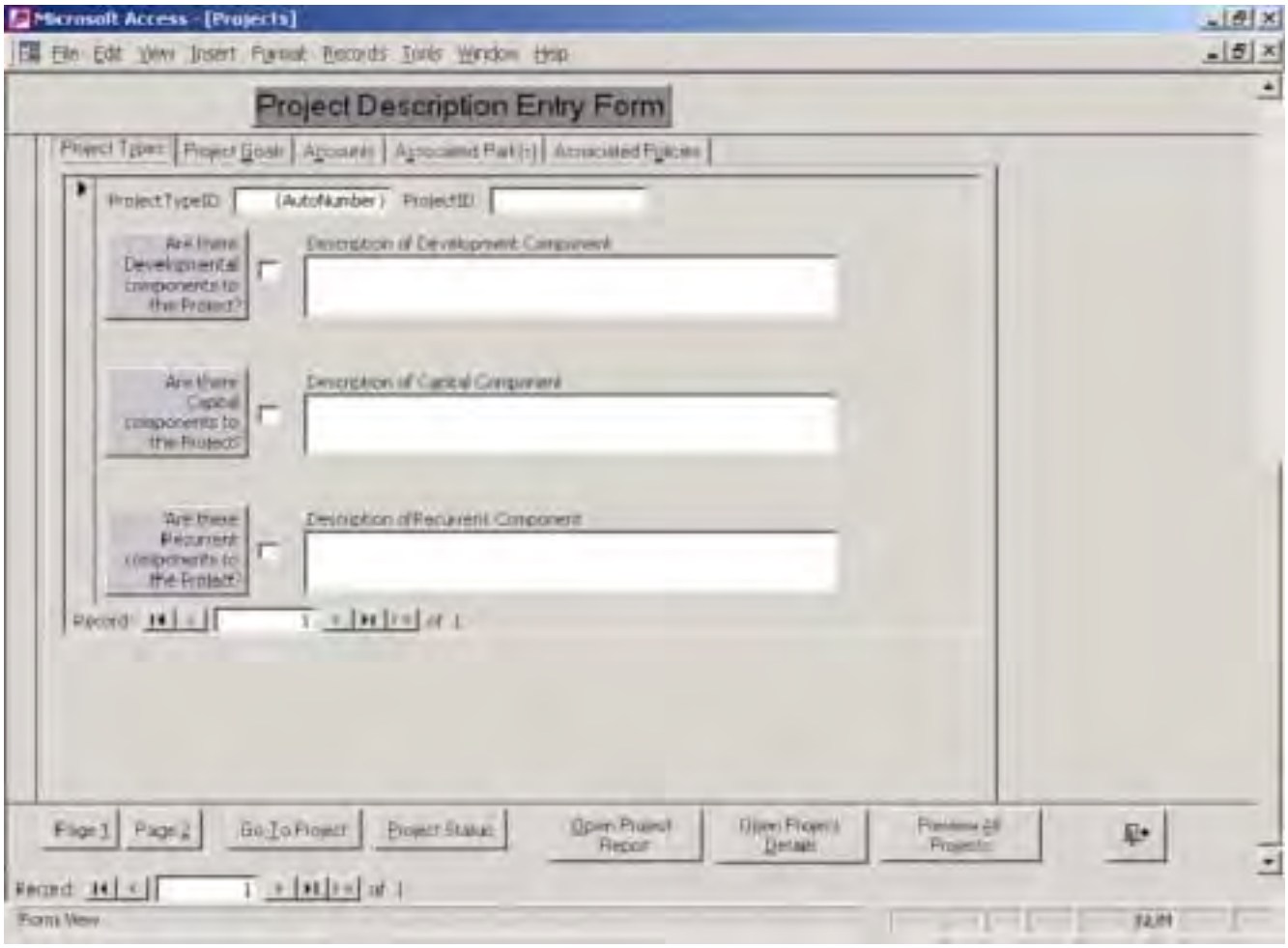

Microsoft Access - [Organizational Synopsis]
File Edit View Insert Format Records Tools Window Help
Organizational Synopsis
YearID
2000
Company Name
British Virgin Islands National Parks Trust
Mission
To preserve and manage designated natural and cultural areas in order to improve the quality of life in the British Virgin Islands.
Vision
The British Virgin Islands National Parks Trust is a locally responsible steward of natural and historical sites of national significance. The Trust employs best management practices and up-to-date information at its disposal to guide decision-making processes. It ensures that sustainable use practices are employed for the protected areas under its jurisdiction while maximizing economic opportunities for British Virgin
Summary of Objectives
The objectives of the Trust are in part derived from Government's overall development goal of improving the quality of life for all British Virgin Islanders, as well as those who may chose to live here. Hence, the overall objectives identified throughout the Budget Outline are designed to manage select natural areas for the following:
Management Plan Synopsis
The Trust is mandated by law to provide management recommendations which are enshrined in management plans for each designated area under its jurisdiction. The review of the "Parks and Protected Areas System Plan for the British Virgin Islands" during 1999-2000, has resulted in the refined of
Reference numerals
Goal Category
Record: 1 of 1
Form View

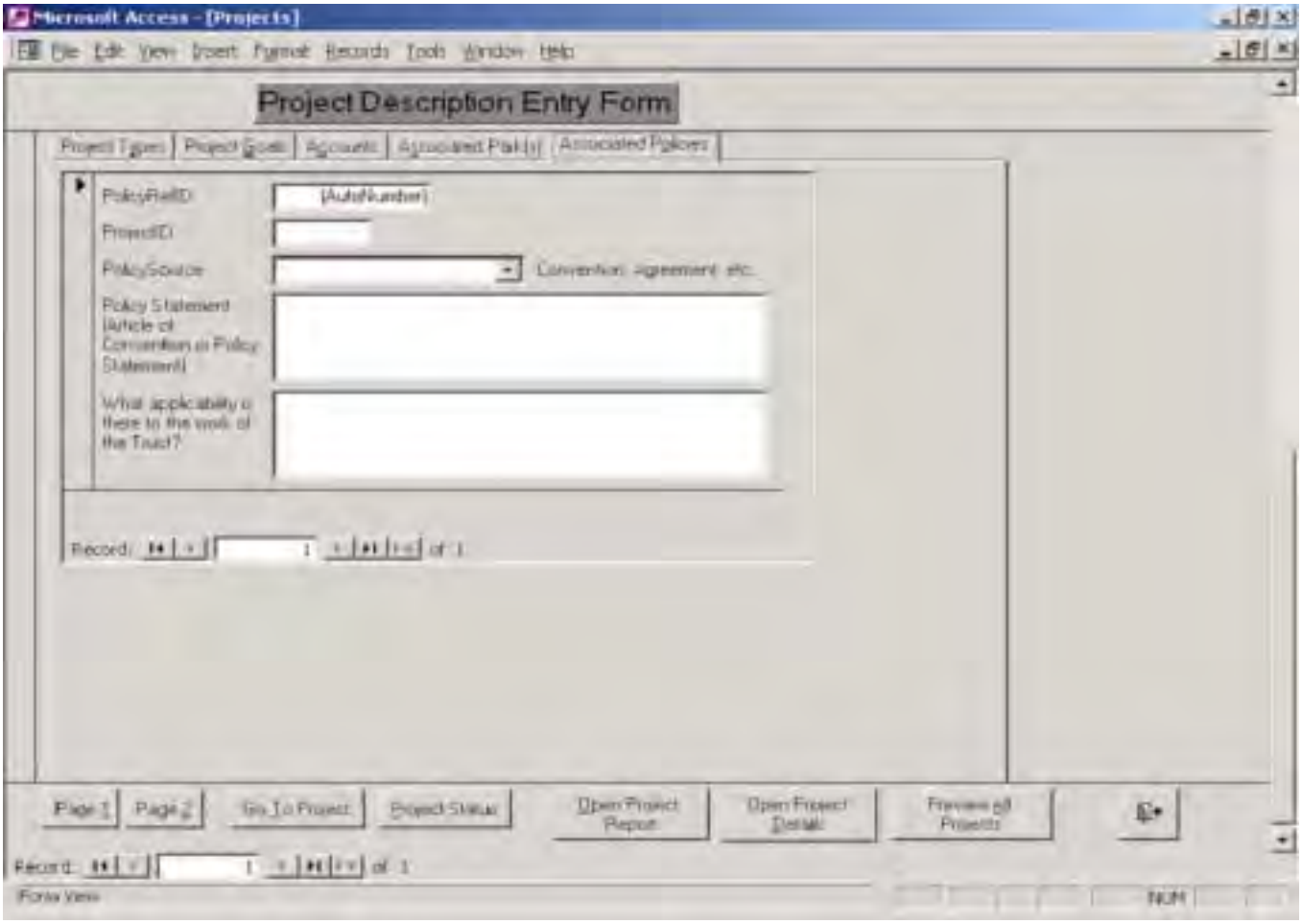

Microsoft Access - [frmGoal Category]
File Edit View Insert Format Records Tools Window Help
Goal CategoryID
YearID
2000
Goal Category
Preserve park resources
Mission Goals
Mission GoalID Goal CategoryID Mission Goals
23 17 Natural and cultural resources and associated values are protected, restored, and maintained in good condition and managed within their broader ecosystem and cultural context
Record: 1 of 2
Strategic Goals: Long Term
Strategic Goal ID Mission GoalID Strategic Goals Duration (Years)
25 23 Biological Value - Commercial Species: Commercially important species are either increased and/or maintained in 17% of targeted park properties [3 of 19 sites]. Commercially important species are increased in one
5
Short Term Strategic Goals
Long Term Strategic Goals Description
Primarily along terrestrial elements of the system
Record: 1 of 5
Record: 1 of 4
Unique identifier for Goal category under the Mission and vision statements

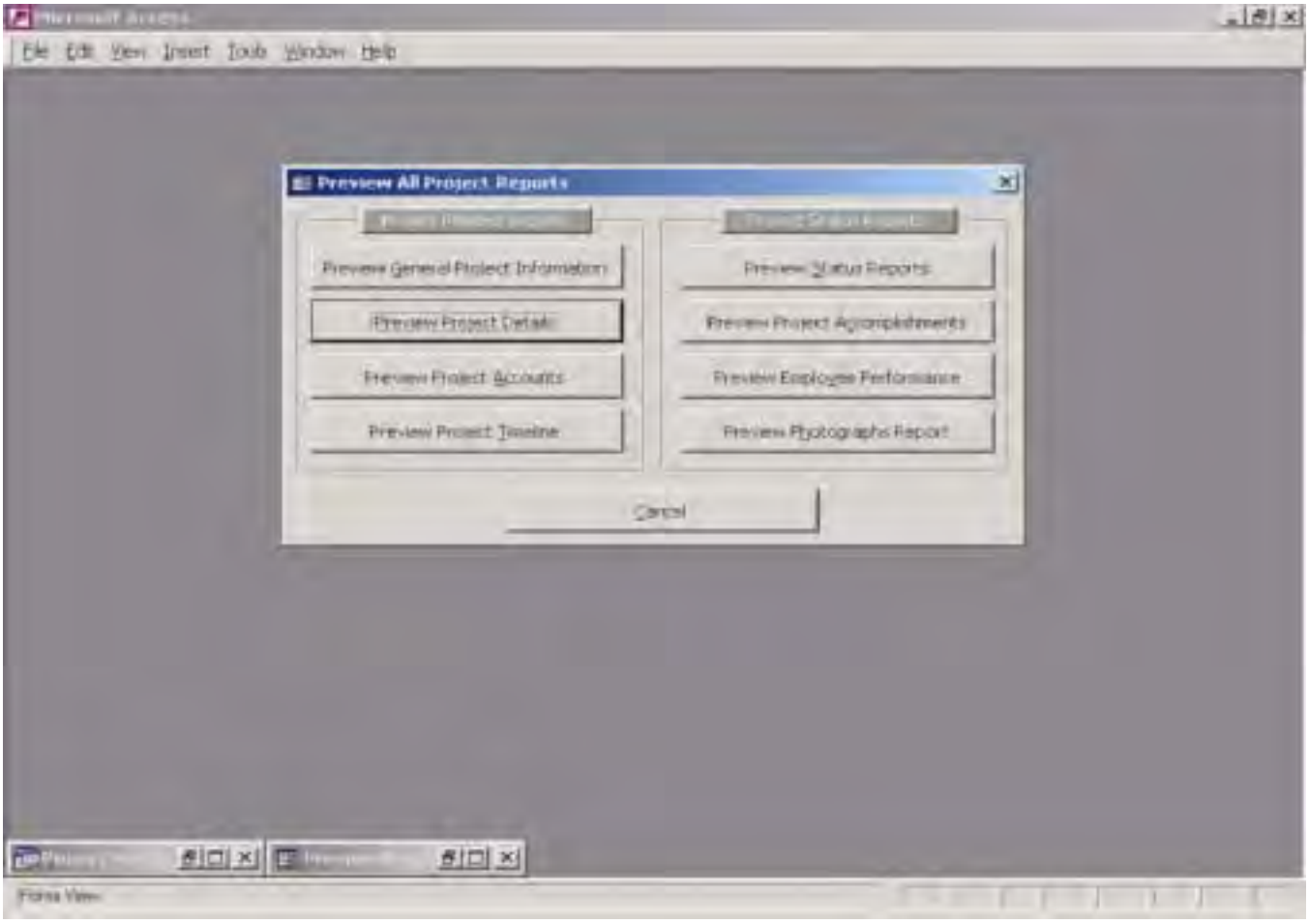

Microsoft Access - [Programme_Structure]
Programme Entry Form
Close Window
ProgrammeID
1
Name
Marine Conservation Programme
Function
Justification
Vision Statement
Programme_Activities
ProgActivityID
ProgrammeID
1
Project Name
Coral Reef Monitoring
Description
A multi-agency coral reef monitoring programme is established and implemented. Requirement include the purchase of monitoring and recording equipment. Staff training is required for proper scientific information collection and collation.
Record: 1 of 1
Form View


Microsoft Access - [Programme_Structure]
Programme Entry Form
Programme_Activities
ProgActivityID
ProgrammeID
1
Project Name
Coral Reef Monitoring
Description
A multi-agency coral reef monitoring programme is established and implemented. Requirement include the purchase of monitoring and recording equipment. Staff training is required for proper scientific information collection and collation.
Cost_yr1
$0.00
Research and Development
Cost_yr2
$0.00
Recurrent
Cost_yr3
$0.00
Capital
Programme_Budgets
ProgrammeID
ProgActi
AccountNumber
Year1
BudgetYear1
Exp_Class_yr1
Year2
10
2
6022030400
2002
$5,000.00
Capital
2003
12
2
6010010110
2002
$2,500.00
Recurrent
2003
(AutoNumber)
2
0
0
$0.00
0
Record: 1 of 2
Record: 1 of 1
Form View


Microsoft Access - [Projects]
File Edit View Insert Format Records Tools Window Help
Project Description Entry Form
Project ID
AutoN
Project Name
Project Description
Project Justification
Comments associated with Project Implementation
Risks
Employee ID
Funding Source
Project Timeline
(MM/DD/YY)
Project Start Date
Project End Date
Date of Project Completion
Project Completed
Project Types
Project Goals
Accounts
Associated Partners
Associated Policies
Page 1
Page 2
Go To Project
Project Status
Open Project Report
Open Project Details
Preview All Projects
Record
of 1
Form View


Microsoft Access - [Projects]
File Edit View Insert Format Records Tools Window Help
Project Description Entry Form
Project Types
Project Goals
Accounts
Associated Partners
Associated Policies
ProjectTypeID
(AutoNumber)
ProjectID
Are there Developmental components to the Project?
Description of Development Component
Are there Capital components to the Project?
Description of Capital Component
Are there Recurrent components to the Project?
Description of Recurrent Component
Record
of 1
Page 1
Page 2
Go To Project
Project Status
Open Project Report
Open Project Details
Preview All Projects
Form View


Microsoft Access - [Projects]
File Edit View Insert Format Records Tools Window Help
Project Description Entry Form
Project Types
Project Goals
Accounts
Associated Parties
Associated Policies
PolicyFieldID
(AutoNumber)
ProjectID
PolicySource
Policy Statement (Article of Convention or Policy Statement)
What applicability o there to the work of the Trust?
Record: 1 of 1
Page 1
Page 2
Go To Project
Project Status
Open Project Report
Open Project Details
Preview all Projects
Record: 1 of 1
Form View
NUM


File Edit View Insert Tools Window Help
Preview All Project Reports
Preview General Project Information
Preview Project Details
Preview Project Accounts
Preview Project Timeline
Preview Status Reports
Preview Project Accomplishments
Preview Employee Performance
Preview Photographs Report
Cancel
Form View

Topic 4: Implementing management plans

One of the most popular sessions (after widespread initial doubts!) at the Calpe 2000 conference was the one on site management planning, involving field exercises. More was called for then, and in the consultation exercise on the agenda for the present conference. We again ran a set of field exercises which are reported at the end of this topic.

Preceeding this, we tried to assemble a set of reports on experience of planned management in a range of different situations. The National Trust (for England, Wales and Northern Island) started off with the built environment, but with many other aspects too of heritage and public inclusion.

A planned presentation on South Georgia to represent uninhabited situations was unfortunately withdrawn. However, the contribution from Tristan da Cunha ably covered both uninhabited islands and small remote communities.

Plans focusing on single species, but thereby having wider benefits, were represented by the Cayman Blue Iguana and the Ouvea parakeet in New Caledonia. Ascension addressed restoration through dealing with invasive species, a project with remarkably rapid initial success, after many years of attempts by the Forum and others to secure funding to start this work. The subject of dealing with invasives is returned to in Topic 6.

All of these plans involve at least some degree of local involvement, and this is a central feature of the presentation from the Turks and Caicos Islands, on a conservation plan of a Ramsar Wetland of International Importance and its surroundings, involving also sustainable development with the local community. An inter-country approach is outlined by the project on marine turtles in Caribbean UKOTs.

That all this is not a new invention is underlined by the presentation from Jersey on management of the ormer, a treasured shellfish, for decades if not centuries.

Leading into the practical exercise and feedback from each site investigated are updates of some relevant current issues under the Ramsar Convention on Wetlands and a general context and introduction to the field exercise.

Chaired by: Andrew Dobson, Bermuda Audubon Society (left); and
Joseph Smith-Abbott, British Virgin Islands National Parks Trust (right)

Conserving and managing the built environment - the meaning and value of heritage

Catherine Leonard, The National Trust for England, Wales and Northern Ireland

Leonard, C. 2003. Conserving and managing the built environment - the meaning and value of heritage. pp 130-138 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The historic environment comprises not only buildings and landscapes and other tangible survivals of our past, but also the history of all the communities who have made their home there. Our physical and cultural heritage is central to how we see ourselves and to our identity as individuals, communities and nations. It reinforces our sense of local and regional distinctiveness. It helps to enhance the quality of our lives, to improve our sense of well being and is a catalyst for social and economic change.

While we in the heritage and environmental sectors understand the significance of the historic environment, its importance is not widely appreciated. This presentation seeks to stimulate discussions about the meaning and value of heritage and to provide an opportunity for sharing experience in protecting and managing the built environment.

Catherine Leonard, National Trust of England, Wales, and Northern Ireland, 36 Queen Anne's Gate, London, SW1H 9AS, UK.
Catherine.Leonard@nationaltrust.org.uk

The three central aims of the National Trust today are:

- to show leadership in the regeneration of the countryside;

Bob Scrambler is one of our 2,000 tenant farmers, who we work with to promote sustainable land management, local foods, training and skills and learning about farm food. He farms in Cornwall and specialises in rare breed sheep. And his wife runs a washable nappy business from one of the farm buildings.

- to promote the meaning and value of heritage to the nation

This family (top of next column) are visiting Corfe Castle in Dorset.

- to make education and lifelong learning central to everything that we do.

Here young people are developing heritage craft skills.

This paper focuses on the second of these – the meaning and value of heritage - but it will, I am sure, come as no surprise to you that all three themes are interrelated.

Kedleston Hall

For the reason we are all here today, in such wonderful surroundings, is because heritage - built, natural and cultural - is important and **what we do matters**. You, as stewards of some of the most beautiful places in the world, some built, some natural, and me because the Trust owns and opens to the public a great many of the same.

After a year in which our Trust recorded record visitor and member numbers, I hope it is fair to say that - in the UK at least, and I hope in your countries too - public interest in our history and heritage is burgeoning. Numbers of visitors to heritage sites, museums and art galleries are rising; interest in family and local history is particularly strong; and history programmes on television and radio are becoming increasingly popular.

A volunteer gardener chatting to a visitor at Chartwell, Kent, South East Region

And while the debate continues about the intellectual quality of TV pop-history there is no denying its appeal – the programmes bring the past to life, they satisfy our thirst for historical accuracy, and they entertain. The ways we acquire our sense of the past and of place may have changed, but the significance of our historic environment persists.

Hugh Edgar, a National Trust volunteer who appeared as the butler in a TV series 'The Edwardian House'.

Whether we learn about history from a television programme, a monument, a novel or biography, from a family photo album, a personal diary, our own observations and memories or from books, our sense of place and heritage values are acutely personal. Indeed, I am sure this is behind the growing interest in local distinctiveness and local history.

People no longer simply want to come and stare in awe at historic buildings - they seek a more personal interaction.

Family at Polesden Lacey, Surrey

A Mori poll commissioned by English Heritage, our statutory agency for the built environment, in 2000 captured some of these attitudes and found that 96% of adults think that the heritage is important to educate us about the past. And 76% agree that their lives are richer for having the opportunity to visit and see examples of our heritage.

The Trust's recent campaign to save from sale and inevitable dispersal a magnificent Victorian estate near Bristol in the West of England highlighted a number of these points.

This beautiful place, called Tyntesfield, came on the market after its owner, Lord Wraxall, died leaving his estate to be split between as many as 19 heirs. The fact that we were able to save Tyntesfield intact is thanks to the huge generosity of our supporters who, over just 100 days, enabled us to raise the money required to buy it and to establish the seeds of its endowment.

But perhaps what was most staggering was the quantity of single donations. Although we were helped on our way by two very large gifts, and a huge contribution from the Heritage Lottery Fund, 50,000 people made small (on average around £40) contributions to the appeal fund, which demonstrated a huge – and to a degree, it has to be said, unexpected – public enthusiasm for the historic environment.

And, less than a year after acquisition, I am delighted that we opened to visitors yesterday (24 March 2003).

Perhaps one of the unique things about this project is the way we are going to involve the public in the future repair and restoration of Tyntesfield. The house and estate are very much as Lord Wraxhall left them - full of the everyday detritus of family life. And we haven't cleared it up or brought in an army of expert conservators or hurriedly interpreted its historical context.

We intend to use Tyntesfield as a training ground for rare conservation skills and hope to involve local communities with our interpretation work by listening to their stories about the house, the family and estate.

Nursery at Tyntesfield

Our challenge at Tyntesfield (and indeed for our properties as a whole) is to build on people's interest in the heritage, to engage them more closely in the decisions we take about management and interpretation, to provide tangible public benefit and to generate wider investment in the heritage economy.

These are the issues I am going to address this morning and they will, I hope, lead to a discussion about the meaning and value of heritage to today's society.

NT visitors buying a plant off a stall at a National Trust Spring Fair at Petworth House in Sussex.

For it is true to say that the huge public interest in the heritage has sadly met with widespread political indifference. The historic environment failed to achieve a single reference in the UK's 2002 Spending Review and I'm sure I do not need to tell you how little public money is available for the heritage. And, linked to this, there is a widespread misunderstanding of what we actually mean by heritage – it is often viewed as 'things' rather than for what it really is: a universal value.

At the Trust we do not have all the answers – we also struggle with the concept of 'heritage' and are trying hard to understand the significance of our historic environment. And we are doing this by trying to pose as many questions as we are answering - by developing local partnerships and networks, by cataloguing oral histories, by rethinking the history we portray and by trying to quantify the social and economic benefits of a good quality environment.

Schoolchildren, with arms raised to respond to a question, on an educational visit to Coleshill Farm, Oxon

As far as economic benefits go, I think we would all agree that conservation organisations make a vital contribution to tourism. And in the UK, the recent (and different) impacts of foot-and-mouth disease and September 11th have demonstrated the importance of the domestic tourism industry to the UK economy.

Tourists arriving at the Farne Islands in Northumberland

Our organisations also create jobs and in research commissioned by the National Trust in several parts of the UK, we have calculated that for each job the Trust creates, between 5 and 9 are created in the local economy, which is a powerful multiplier effect.

The exterior of the General Store, Bay Town, Robin Hood's Bay

I am now going to show you some examples of how we are seeking new and innovative ways of interpreting our built properties and also to show something of the Trust's work as a mini development agency - raising money in more prosperous parts of the country and investing it, often in remote, rural areas, giving a vital boost to their economies as well as delivering major heritage and environmental benefits.

Carpenter and assistant measuring a length of replacement timber in the roof of cattle sheds at Llanerchaeron Farm. The wood will be cut with an adze beforehand and pegged with wooden pegs. The charming C18th Estate Office at Llanerchaeron, set in a field of bluebells. The rough stonework of the cottage is painted pink and white and the windows and doorframe are arched.

At Llanerchaeron in a remote part of mid Wales, we are bringing life back to the estate of a late 18th

century Welsh family. The estate had its own farm and granary as well as large double walled gardens, which have remained largely unaltered (though sadly neglected) since its heyday. Llanerchaeron is currently undergoing an extraordinarily sensitive restoration, returning many of the buildings to their original usage and appearance, using local skills and craftsmen to do the work. The project also involves landscape and nature conservation to encourage greater diversity of wildlife habitats and species such as the red kite, otter, and brown hare.

And from remote rural Wales, to the London suburbs, where the Trust has just this year acquired the home of artist/designer, William Morris, in Bexleyheath, South East London. William Morris shared with the founders of the National Trust a belief in the power of beauty to enhance the quality of our lives and this principle is as relevant today as it was 150 years ago. Through opening Red House and its garden as a community resource we hope to play an important part in boosting the role our heritage can play in Bexley's future.

William Morris portrait from Wightwick Manor in the West Midlands

And from the 1850s we jump forward in time to the 1950s and Mendips in Liverpool. John Lennon's childhood home, where he lived with his Aunt Mimi from the age of 5 until he left home at

23, which has been kindly donated to the Trust by Yoko Ono Lennon, and which we will open to the public on Saturday 29 March.

Paul McCartney lived a short walk away at number 20 Forthlin Road in a 1940s semi also cared for by the National Trust. And through these two Beatles properties, together with the home and collection of Liverpool society photographer, Edward Chambré Hardman, recently secured by the Trust, we are beginning to play our part in Liverpool's cultural renaissance, and are very supportive of its recent nomination for World Heritage Site status.

We are constantly thinking of new and innovative ways to interpret our properties and here (below) at Dolaucothi in Carmarthenshire, where visitors can already explore the site above and below ground, a new exhibition explains how to measure the value

of gold, how different techniques have been used to mine for gold, from the Romans to the Victorians, and how gold was used both in the past and modern times.

Alongside exhibitions, we use drama and live interpretation to tell our properties' stories or to explore issues. This year we are launching a new touring theatre workshop called '*What's the real deal?*' which tells the story of a supermarket, called Real Deal, where the supermarket manager, the owner of a local farm shop, a shopper and an eco-warrior engage the children (who are acting in role as journalists) in debate about the issues of food, farming and sustainability. This workshop was

piloted last year as part of '*Your Wake up Call*' - a youth project aimed at involving young people in the World Summit on Sustainable Development. It is touring schools this spring alongside our existing theatre programmes, *Whose land is it anyway?* and *Mud, Mulch and Marigolds*.

Last year we opened the Workhouse in Southwell, Nottinghamshire. Here the Trust aims to create a better understanding of the poor and destitute, and to explain the development of a system which was the foundation of social welfare today.

We were determined not to sanitise the experience

and visitors will not find gardens, shops or teashops but are confronted instead with bare rooms, which they are encouraged to furnish with their imagination; and an exhibition about poverty and how we deal with it today.

And next year we will take on the running of the Back to Backs in Birmingham, where we are currently working with the Birmingham Conservation Trust to restore this complete and unique

courtyard of back-to-back housing – a rare survival of British social history. At the heart of the Back to Backs are the stories of the people who lived and worked in these houses from the time they were built to the present day. They, unlike the back-to-backs of the northern mill cities, were artisan's houses, in their time proud and relatively luxurious compared to the rural poverty whence their occupants came.

We will be using the stories of real people and the memories of recent occupants to trace the decline of these homes from the birthplace of Birmingham's wealth to condemnation as slums in the 1960s.

These ideas draw on the experience of the truly inspiring Tenement Museum in the Lower East Side of New York. The museum, at 97 Orchard Street, tells the stories of the people who lived in the tenement over the years –Nathalie Gumpertz who turned her apartment into a dressmaking shop when her husband left her; Abram and Zipe Heller who immigrated from Lithuania in 1901; Abraham and Fannie Rogarshevsky, and other families. It captures the atmosphere, spirit and collective memory of the East Coast immigrants from which something like a third of the entire American population owes its origins today.

The new visitor centre at Sutton Hoo, an important archaeological site in East Anglia

All of these examples demonstrate the ever-widening concept of the meaning of 'heritage' itself. Organisations like all of ours can help to redefine the very nature of what is historically significant. We are making a small step towards this through our acquisition of semis, workhouses and industrial sites.

Attingham Park in Shropshire

However, simply broadening the definition of the heritage portfolio is still to miss the point. The historic environment is far more than what stands before us. It is an integral part of the wider environment and includes landscape, culture and nature as well as buildings.

You understand, instinctively I am sure, what I mean.

Our heritage is all around us. It may be above or below the ground. It includes cultural and intangible elements as well as physical ones; and decay and decline, as well as wonder and splendour. It is atmosphere and mood as well as bricks and mortar.

This is the Cobham Memorial in Kent which the Trust has recently acquired.

Castlerigg Stone Circle in the Lake District, a free standing megalithic circle of 38 stones with a further 10 inner stones forming an inner rectangle

And yet the significance of our heritage goes even

further – to play a role in memory, in forging identity and in contributing to our quality of life. It is people as well as place. This, I suggest, is what is behind the current surge of interest in heritage. A growing awareness of how historic landscapes and buildings enrich the lives of whole communities – and how their loss will impoverish us.

The part of the Giant's Causeway World Heritage Site (in Northern Ireland) protected by the Trust.

And this shows a listed property at the entrance to the site, which has been partly demolished by its owner to make way for a Arts Crafts and Cultural Centre, which we feel would seriously compromise the context of the World Heritage Site.

The impact in the wider countryside and around our towns and cities of sprawling or insensitive development, rising traffic levels and new infrastructure are all contributing to a loss of local character and distinctiveness, leaving often anonymous, indistinguishable towns, villages and countryside.

It is clear that heritage has the capacity to contribute that indefinable 'glue' which holds places and groups of people together. Perhaps the next challenge is to ensure that between us we also offer an accessible and meaningful interpretation of heritage to communities that are not yet persuaded of its importance. For us in the UK these include those living in the poorest areas, from minority backgrounds, or those who simply feel excluded from notions of heritage.

The Asian Women's Project – Hardwick Hall, Chesterfield, Derbyshire

The Trust is not, of course, in a position to lecture anyone on social inclusion, and I know that many of you are ahead of us in reaching out to new audiences and we look forward to hearing about your experiences.

A project in a London property where we have been working with homeless people exploring the idea of home through photography and creative writing.

We are doing our best to approach this challenge intelligently and thoughtfully, including the involvement of local people in the development of 'Statements of Significance' which provide the bedrock of our Property Management Plans.

These statements try to capture what matters about these places – to everyone – and what we must strive to retain through sensitive management, and explain through excellent interpretation.

Like you, our commitment to providing involvement and access allows people the chance to directly and intimately experience places of historic interest and natural beauty, and often, quite

Stourhead

simply, access to an inspirational experience.

So the final thread to my talk is how we can capture and build on this sense of engaging people's emotions and enriching their lives. We hope that everyone who visits a National Trust property goes away enriched. With some – especially children – this can be a formal learning experience.

The Butler inspects the children's home-made butter at Ham House.

But over time we are finding that more and more of our visitors want the same chance; not only to enjoy but to learn, through the interpretation we provide, but also by using our properties as a source of inspiration and instruction.

A painting course at Petworth House

These youngsters are refugees and they are using the story of the Murray family of Ham House near London, who fled to exile in France during the English Civil War, as a way of reflecting on their own circumstances.

So I hope I have explained how, in addition to its importance for its own sake, heritage brings huge public benefit through education, training, community involvement and economic and social benefits to local communities.

And when heritage trusts like ours decide to invest in an area, we invest for ever – the investment we make supports sustainable development, which not only respects, but in many ways 'is' the very sense of place which people increasingly seek.

I realise that I am speaking to the converted, but hope I have excited your curiosity to learn more about some of the more unconventional approaches we are taking, which complements the activity that you are probably more familiar with.

And I hope it goes without saying that we claim no monopoly of wisdom on the management of the built heritage or how it is interpreted and we deeply value our relationships and the chance to exchange experiences and ideas with you.

Conservation challenges in small communities: conservation management in the Tristan islands

James P. Glass & Peter G. Ryan

Peter Ryan

Glass, J.P. & Ryan, P.G.. 2003. Conservation challenges in small communities: conservation management in the Tristan islands. pp 139-147 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Tristan da Cunha is a globally important biodiversity hotspot, with large numbers of endemic taxa, including 11 birds, at least 60 invertebrates, 29 flowering plants and 17 ferns found nowhere else. Endemism among other taxa is less well known because of limited sampling, but it is not restricted to the terrestrial biota, with at least 1 fish, 40 marine invertebrates and perhaps as many as 50 seaweeds endemic to the islands. With the exception of the main island of Tristan, the impacts of humans and introduced organisms have been relatively limited. The uninhabited islands, especially Inaccessible and Nightingale, are among the least disturbed temperate islands. This importance has been recognised by the people of Tristan who have declared Inaccessible and Gough Islands nature reserves, and placed significant restrictions on activities at Nightingale Island. Currently more than 44% of the land area of Tristan is formally protected. Management plans have been produced for both island reserves, and are being implemented to the extent that available funding permits.

Unfortunately, it is not all good news. Despite this significant commitment to conservation, many of the endemic taxa are threatened. Among birds, the best known group, 11 are listed as Threatened and a further 3 Near Threatened, including 10 of the 11 endemic species. The picture for invertebrates is equally bleak, at least at Gough and Tristan. The major threats to biodiversity are introduced organisms, uncontrolled fishing activity and climate change. Species already introduced to the islands pose a significant threat to a wide range of biodiversity. Where feasible, introduced species have been identified for eradication programmes, but for many species we lack the capacity to eradicate or even control their populations. In addition, the ever present spectre of new introductions has to be guarded against vigilantly. Evidence from Gough Island suggests that control measures have been unable to halt the arrival of new species at the island. Unregulated fishing poses a significant threat to several seabirds breeding on the islands, including three endemic species. In the longer term, climatic warming also poses a significant threat, in part through facilitating the invasiveness of introduced species.

Tristan has limited capacity to address these threats to its globally important biodiversity. With a community of only some 300 people, there are insufficient personnel and infrastructure to address the island's conservation needs. The shortfall of skilled personnel is partly addressed through an informal body of conservation 'advisors' that provide advice to Tristan's Natural Resources Department. However, there is a pressing need for greater skills and awareness development among the island community. The long-term conservation of the islands' wealth of biodiversity depends on sustainable, well-managed fisheries throughout Tristan's Exclusive Economic Zone (EEZ). Well regulated fisheries have limited impacts on natural resources (including seabirds) and also ensure financial security for the island community, reducing pressure on natural systems through harvesting and agriculture. Although problematic, policing fishing activities within Tristan's EEZ is an immediate conservation priority.

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Introduction

Tristan da Cunha lies in the mid-South Atlantic, roughly mid-way between Cape Town and South America. It comprises three main islands: Tristan (96 km^2), Inaccessible (14 km^2) and Nightingale (4 km^2), with the much smaller Stoltenhoff and Middle (or Alex) Islands lying off Nightingale. Gough Island (65 km^2) lies some 350 km SSE of the Tristan archipelago, but is administered from Tristan. The islands are all volcanic in origin, ranging from 18 to 0.2 million years old, and from some 300 m to more than 2000 m in elevation. Because they have never been connected to a continental land-mass, the terrestrial biota is disharmonic, lacking many organisms that have been unable to disperse across the almost 2500 km from the nearest landmass. Like many oceanic islands, the biota contains many endemic forms, including several adaptive radiations that have resulted from rapid evolutionary events.

The settlement of Edinburgh on the main island of Tristan is home to some 300 islanders, and is famous as the most isolated community in the world. Tristan has been inhabited since the early 1800s, apart from a brief period in the early 1960s, when the community was evacuated to the United Kingdom following a volcanic eruption adjacent to the settlement. The other islands are uninhabited, apart from a South African weather station on

remote Gough Island, which has a team of six personnel on one-year contract appointments. Tristan is a United Kingdom Overseas Territory. Although it has its own Island Council and an Administrator appointed from the UK, some aspects are treated by UK Government as forming part of the St Helena Overseas Territory. This rather convoluted, dual administrative structure leads to some unhappiness, because it is perceived as an impediment to accessing funding for conservation and other initiatives directly from the UK. For example, Tristan is dependent on inclusion in St Helena's single application to the European Union for funding.

A biodiversity hotspot

The Tristan islands are the only temperate oceanic islands in the South Atlantic. They support a large number of endemic species, including 11 birds, at least 60 invertebrates, 29 flowering plants and 17 ferns found nowhere else. Endemism among other taxa is less well known because of limited sampling, but it is not restricted to the terrestrial biota, with at least 1 fish, 40 marine invertebrates and perhaps as many as 50 seaweeds endemic to the islands. Among the flagship endemic species are the Inaccessible Rail *Atlantisia rogersi*, which is the smallest flightless bird in the world, five other endemic landbirds, and five seabirds that are confined as breeding species to the islands. Many other seabird species have globally important breeding populations at the islands, with Gough Island being the

single most important UK site for seabirds. There are also significant populations of Subantarctic Fur Seals *Arctocephalus tropicalis* as well as the most northerly breeding site for Southern Elephant Seals *Mirounga leonina*. Tristan is the only archipelago in the oceanic South Atlantic, and is thus the only site of an adaptive radiation among landbirds (island birds apparently require multiple islands to speciate).

Trouble in paradise

The main island of Tristan has been quite severely affected by humans and their commensals. Grazing by livestock and introduction of grasses and other plants have completely transformed the lowland areas into alien pastures. Currently alien species outnumber native flowering plants by almost 3:1. Direct exploitation and predation by introduced rats and cats have severely reduced numbers of breeding birds, causing local extinction of some

species, including the endemic bunting *Nesospiza acunhae* and moorhen *Gallinula nesiotis*. This is not to say that the main island has little value for conservation. The steep cliffs and upland areas still support significant areas of natural vegetation, and the island is the only known site for several endemic plants. The island also offers several opportunities for habitat and species restoration programmes.

By comparison, the uninhabited islands are among the best preserved temperate oceanic islands in the world. They have few introduced animals and plants, and at least to the casual eye they appear virtually pristine. Both Inaccessible and Nightingale lack any introduced vertebrates (although both had livestock on them in the past), and have relatively few introduced plants (23 and 5, respectively). Fortunately, few of these alien plants are widespread, and most are restricted to disturbed sites such as the coast, stream margins and areas disturbed by birds and seals. Gough Island also has few introduced plants, of which only a couple are widespread. However, it does have introduced House Mice *Mus musculus*, which are cause for grave concern because of their likely impacts on native invertebrates and, increasingly, on seabirds. Recent work suggests that the mice, which have evolved large body size on Gough, are killing significant numbers of seabird chicks, including the threatened Tristan Albatross *Diomedea dabbenena* and Atlantic Petrel *Pterodroma incerta*, both of which are virtually confined to Gough Island.

Perhaps even more worrying are the findings of a recent Darwin Initiative-funded study of the macro-invertebrates on Gough Island. This found that 72% of macro-invertebrate species are likely to have been introduced, and that introduced species are distributed throughout the island, completely dominating the invertebrate fauna in terms of abundance and biomass (Jones *et al.* in press). Although no native species recorded by Martin Holdgate during the Gough Expedition in 1956/57 has gone extinct, some are now extremely rare, apparently as a result of displacement by closely related introduced species. Also, there is a real concern that the introduced invertebrates could alter ecosystem functioning at Gough Island. Several groups of invertebrates, such as earthworms, slugs and millipedes, are represented solely

by aliens. Earthworms now dominate the biomass of invertebrates, and may well alter peat formation dynamics, which is essential for the entire functioning of the terrestrial ecosystem. Less is known about invertebrates on Inaccessible and Nightingale, but similar problems almost certainly occur there.

Threats to the islands' biota are not restricted to the land. All the albatrosses and most of the larger petrels that breed on the islands are killed accidentally by longline fisheries, and this is listed as the primary threat facing three of the five threatened seabird species that breed at the islands (BirdLife International 2000). Recent analysis of demographic data for two albatross species from Gough Island indicate that their populations are decreasing even faster than previously thought, and proposals have been drafted to upgrade their threat status, including the first listing of Atlantic Yellow-nosed Albatross *Thalassarche chlororhynchos*. The limited data on sanctioned demersal longline fishing within Tristan's EEZ suggests that this fishery has relatively minor impacts on breeding seabirds (Glass et al. 2000). Pelagic fisheries probably kill more birds, and control of these fisheries is more problematic (Glass *et al.* 2000). However, the greatest threat is posed by illegal, unregulated and unreported (IUU) fishing, because these pirate vessels make little if any attempt to limit bird bycatch.

Conservation legislation

The islands were at the forefront of the development of modern conservation thinking, thanks to the insightful *Man and nature in the Tristan da Cunha islands* (1976) written by Nigel Wace and Martin Holdgate, both members of the original Gough Island expedition. This booklet resulted in the drafting of the Tristan da Cunha Conservation Ordinance, 1976, which provided a sound framework for modern conservation legislation and action. *Inter alia*, the 1976 ordinance placed controls on the importation of plants and animals, limited the use of pesticides and herbicides and put in place broad protection measures for the native vegetation and soil. It also declared Gough Island a wildlife reserve and placed restrictions on direct exploitation of seabird and marine mammal populations.

The protection afforded the natural environment at Tristan has been extended by subsequent amendments to this legislation, which have increased the extent of protected areas and further limited the range of birds that can be exploited by islanders. The most significant amendment was the Tristan da Cunha Conservation (Amendment) Ordinance, 1997 which declared Inaccessible and Gough Island to be nature reserves, and extended the boundaries of the marine reserves around these islands from 3 to 12 nautical miles. This resulted in 44% of the islands' land area being formally conserved, and afforded protection to most of the islands' endemic species.

The conservation ordinance is augmented in the marine environment by the Tristan da Cunha Fishery Limits Ordinance, 1983 (and amendments in 1991, 1992 and 1997). This act provides strict controls on fishing activities within the Exclusive Economic Zone that extends 200 nm around Tristan and Gough.

Management plans and management capacity

Although sound legislation was in place, Tristan lacked the institutional capacity to translate the legislation into conservation management plans. In the early 1990s, then Administrator Bernard Pauncefort obtained funding from WWF-UK for the drafting of a management plan for the Gough Island Wildlife Reserve. It was Bernard's vision that the UK apply for World Heritage Status for Gough Island, and a management plan for the island was an important prerequisite for this application process. The management plan was duly published in 1994 using the expertise of scientists based in Cape Town but who had considerable research experience of the island (Cooper & Ryan 1994). A key aspect of the management plan was setting up the Gough Island Wildlife Reserve Advisory Committee, an informal group of special-

Limited domestic capacity

ists that could be called on to provide advice on specific management issues. Gough Island was duly inscribed as the UK's second natural World Heritage Site in 1995, and this proved so popular with the island community that it provided the impetus to have Inaccessible Island declared a nature reserve in 1997.

Two other significant developments took place in the mid-1990s. First was the formation of Tristan's Natural Resources Department. This was set up under the leadership of James Glass, primarily to manage the sustainable use of the territory's marine resources. The department is small, and struggles to meet its fishery observer obligations, but it also provides a mechanism for conservation management at the islands. Second, the island took delivery of a small fisheries patrol vessel as well as a police/customs rigid inflatable, which greatly increased the ability of the Natural Resources Department to patrol the waters around the northern islands, and land on the uninhabited islands.

Finally, in 1999, WWF-UK agreed to fund the drafting of a management plan for the newly declared Inaccessible Island Nature Reserve (Ryan & Glass 2001). This was written jointly by Peter Ryan and James Glass during a six-month visit to the islands in 1999/2000 by PGR, and accepted by the Island Council in early 2001. Implementation of the plan was the responsibility of Tristan's Natural Resources Department, although there remains a body of off-island expertise that can be called on for advice. Once again the management plan was a precursor towards applying for Inaccessible to be awarded World Heritage Status as part of the Gough Island site. The decision on this application is pending, following its submission in 2002.

Managing threats

The management plans interpret the Conservation Ordinance to provide practical management guidelines and protocols for each of the island reserves.

The issues included are:

- protection of the biota
- control of introduced (alien) organisms
- preventing the introduction of new alien species
- setting policy for local extinctions and *ex situ* conservation measures
- preserving historical sites
- controlling access to the islands
- zoning of the islands and defining allowable activities in each zone
- placing restrictions on use of hazardous materials
- waste management and pollution prevention (including light pollution)
- fire prevention

Of these, the main issues are managing alien species and preventing the arrival of new alien species. We shall not report on specific protocols in any detail here, because they are dealt with in considerable detail in the management plans for Gough and Inaccessible Island (Cooper & Ryan 1994, Ryan & Glass 2001). The management plans also require record keeping of visits, and set guidelines for revision to management plans on a regular basis.

Have the management plans been successful?

It is too early to assess whether the Inaccessible Island plan has been effective; indeed there have been only a couple of day visits to the island since the plan was published. However, it is almost 10 years since the Gough Island Management Plan was adopted. Its success can be measured from the reports of environmental inspectors who accompany the annual re-supply visit to the weather station on Gough Island, as well as scientific surveys of the island's birds, larger plants and macro-invertebrates that have taken place in the last few years.

The management plan for Gough Island has greatly improved the logistic operations surrounding the weather station on the island. Major advances include careful screening of all materials taken to the island, inspection of all warehousing facilities and vessels prior to sailing for Gough, and banning of materials deemed to carry an unacceptably high risk of introducing alien organisms (e.g. fresh fruit and vegetables, building sand, etc.). Other issues also were addressed, such as improved waste management, appropriate controls on light pollution and limits on routes walked. The South African Department of Environment Affairs & Tourism's Antarctic Division has to be congratulated for the progress made, although in some instances it took several years before measures were adopted. For example, the ban on the re-use of storage containers previously used on Marion Island, the other South African sub-Antarctic station, only came into force after these containers were almost certainly responsible for carrying a particularly aggressive invasive plant from Marion to Gough.

Despite the improvements in logistic activities, new species are still reaching Gough Island. During the late 1990s, one alien plant *Sagina*

procumbens and several new invertebrates were introduced to the island. Fortunately the insects did not establish populations, but *Sagina* was already well established within an area of approximately 1 ha around the landing area when it was spotted by the environmental inspector in 1998. Funds were made available for rapid action to deal with this species, which has the potential to overrun the highland areas of the island. Niek Gremmen initiated a control and eradication programme that initially had marked success, but it requires ongoing support if the programme is to be ultimately successful.

Another problem that has emerged since the management plan was implemented at Gough Island is dieback of the island trees *Phylica arborea*. This appears to be the result of a novel plant pathogen. It is unknown how or when this pathogen arrived on the island, but it highlights the problems of halting the introduction of micro-organisms to the islands. These failures of the management plan to halt introductions emphasise the need for continued vigilance. The Gough management plan is overdue for review, and it is hoped that funds for this process will be awarded in 2003. This review will take on board lessons learned during the last 10 years, as well as updating the conservation status of the island, based on recent surveys of especially breeding birds and macro-invertebrates. One alarming result to emerge from recent studies is the apparent impact introduced mice are having on populations of threatened, endemic seabirds through direct predation of chicks. This finding places even greater pressure on finding ways to tackle the island's mouse population.

Off-island problems

The management plans deal primarily with land-based activities at Gough and Inaccessible Island Nature Reserves, but the boundaries of these reserves include adjacent waters out to 12 nautical

miles, which include commercial fishing grounds for Tristan rock lobster *Jasus tristani*. Although most of the controls placed on this fishery are set by Tristan's Natural Resources Department under the Tristan da Cunha Fishery Limits Ordinance, the management plans provide guidelines for controlling solid wastes and light pollution from fishing vessels. However, the seals and most of the seabirds breeding at the islands range well outside the marine limits of the reserves, and thus are not protected during much of their lives.

IUU fishing activity takes place inside Tristan's EEZ, but there is virtually no capacity to assess, let alone control, this activity. Tristan's Fishery Limits

Ordinance provides for punitive fines for fishery transgressions, and there is urgent need for deep-water patrols (aerial or ship-based) to provide at least some deterrence to IUU fishing. Unfortunately to date repeated appeals to the Royal Navy to conduct patrols when vessels pass Tristan en route to and from the Falklands have failed to result in any action. In the longer term, the UK Overseas Territories and other small island states need to lobby for legislation requiring satellite-tracking vessel monitoring systems (VMS) on all vessels, so that Tristan can track vessels operating in or close to its waters. However, most seabird species that breed at the Tristan islands range well outside the 200 nautical mile EEZ, extending throughout the South Atlantic, or in the case of Great Shearwaters *Puffinus gravis*, throughout both the North and South Atlantic. The effective long-term conservation of these species depends on control of longline fishing mortality throughout international waters as well as the EEZs of nations bordering the Atlantic Ocean.

The ability of Tristan to police its waters effectively has conservation importance that extends beyond the need to limit seabird bycatch. Tristan's economy is based largely on revenues derived from fishing and fishing concessions. Recent sound management of fishery resources has resulted in significant increases in income for the island's community, which has had positive benefits for the environment. There is now less reliance on harvesting seabird products from Nightingale Island, and reduced pressure for access to grazing on the offshore islands. Every effort should be made to ensure that Tristan's fishery resources are secure and continue to be managed relatively conservatively.

Priorities for action and the challenges ahead

There is a need for more conservation management capacity on Tristan, but very few people enter the workforce on the island each year, limiting the pool of available candidates. Greater emphasis on conservation as a potential career track is needed, and it is hoped that the forthcoming Darwin Initiative-funded programme based on Tristan will stimulate such interest. The production of a simple guide to the islands' fauna and flora, designed for tourists and residents alike, will also help to raise awareness of the islands' unique diversity.

Throughout we have emphasised that the greatest threats to the islands' biodiversity are posed by alien species, and the risk of new aliens arriving at the islands. The dangers of alien species already on the islands are likely to be exacerbated due to ongoing climate change. Mean air temperatures at Gough Island have increased significantly over the last three decades (Jones *et al.* in press), and experience elsewhere indicates that climate change has the potential to alter the invasiveness of naturalised species.

In a sense, the management plans for Gough and Inaccessible Island have started with the 'easy' conservation issues in the Tristan islands, because of limited overlap with the activities of the island community. There is a need for management plans for Nightingale and ultimately the main island of Tristan. These are more sensitive and complex issues, with activities such as exploitation of

seabirds and guano at Nightingale and agriculture at Tristan not included in the Gough and Inaccessible Island management plans. However, plans for the conservation of these islands will be a valuable tool for long-term planning and management of the islands, and go a long way to meeting Tristan's international obligations to conserve its biodiversity.

Acknowlegements

We thank the conference organisers for the opportunity to attend the meeting in Bermuda; it is unfortunate that James was unable to attend due to commitments on Tristan.

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Species Action Plan for the Ouvéa parakeet *Eunymphicus uvaeensis* in New Caledonia, 1997-2002

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The Ouvea parakeet *Eunymphicus uvaeensis* is endemic to the small raised-coral atoll of Ouvéa, east of the main island of New Caledonia, a French overseas territory in the South Pacific. This island has never suffered from European domination, and so is still run in the traditional Melanesian way, with tribes owning land, sometimes resulting in local conflict. The local people live essentially off fishing, and cut and burn cultivation; and an important supplementary income is from the selling of parakeets for the pet trade. In 1992 a NGO for the protection of the parakeet was set up by the chiefs of the island tribes together with members of the CIRAD, a French research and development institution. The study and protection of this bird were included in 1993 in the work plan of this institution. The vet of the Loyauté Islands worked on this species for his PhD, work which culminated in the writing of an action plan at the end of 1996 as the outcome of an international seminar. The first five years of the plan have been completed very successfully with the Ouvéa parakeet well established as the symbol of the island. It is now recognised as a species and classified as Endangered under the IUCN criteria, and was put on Appendix 1 of CITES in order to reduce the illegal trade.

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Introduction

This talk is about one of only two species action plans for birds prepared in the French overseas territories (*territoires outre-mer* TOM), none has yet been prepared in an overseas *département* (DOM) of France. For biodiversity action plans the situation is similar. There is one for metropolitan France, but none in any of the DOM-TOMs.

The Species Action Plan for the Ouvéa Parakeet does not fit into an official protocol within France or the European Union. Those who initiated it should therefore be commended, and full recognition should also be given for the considerable support that has come from local Melanesian provincial government. This Action Plan has been validated by experts in bird conservation from the South Pacific and Europe.

The table below on avian biodiversity in the French DOM-TOMs is a reminder of the impor-

Avian importance of French DOM-TOMs
(CT + collectivité territoriale, a third category)

	GUADELOUPE	MARTINIQUE	REUNION	FRENCH GUIANA	MAYOTTE	NEW CALEDONIA	FRENCH POLYNESIA	FRENCH SOUTHERN TERRITORIES
STATUS	DOM	DOM	DOM	DOM	CT	TOM	TOM	TOM
Biological criteria								
Endemic family	0	0	0	0	0	1	0	0
Endemic genera	0	0	0	0	0	3	0	0
Endemic species	1	1	10	0	3	25	26	3

Location of some of the French DOM-TOMs

tance of these areas for biodiversity and endemism. The Territories are particularly important.

The French DOM-TOMs are almost all islands, with the exception of French Guiana and Terre d'Adélie (the latter in the Antarctic), and essentially in the tropical or sub tropical zone. Their insularity is one of the reasons for their species richness. French Polynesia has 23 world endangered bird species, 15 of which have such small populations they could go extinct in the next few decades.

This action plan is for a species in New Caledonia, in the South Pacific, the jewel in the crown of French biodiversity with 25 endemic bird species, 40 endemic reptiles and over 2500 endemic plant species. The species occurs on Ouvéa Island, a raised atoll of 132 km² which lies 80 km NE of La Grande Terre and is one of the Loyalty Islands.

Inhabited by Melanesian people, this island was never occupied by Europeans, and suffered badly in the violent political troubles of 1988. The population density, with 27 inhabitants/km², is three times as high as the neighbouring islands. Responsibility for the environment is devolved to the territories, and within New Caledonia down to the Province level of which there are 3, the Loyalty Islands being one.

The species concerned is the Ouvéa parakeet, once considered a sub-species. Since 1999, it has been recognised as a species in its own right. It is endemic to Ouvéa, and once occurred all over the island, but is now essentially restricted to the north of the island, with a small population in the south.

Throughout the 20th century this species has been perceived to be in decline, but there had never been an accurate census until 1993. In 1947, Warner published an estimate of 1000, more recently Hahn published in 1993 an estimate as low as 70-90.

What are the reasons for the species decline?

1. Loss of forest habitat

In 1930s large areas of forest were lost due to fire. Since then there has been continual clearance of the forest for subsistence agriculture on this coral atoll where soils are thin. This activity complements the income from fishing. It is estimated that half of the remaining forest has disappeared between 1950 and 1990.

2. Illegal pet trade

These birds are easy to tame, and would seem predestined for the pet trade ! There has always been a tradition on the island to have them as pets, and today there is also a major market in Nouméa, capital of New Caledonia, and a small number go overseas, estimated at 50 in France. The birds are worth 200 US$/bird, which is a third of monthly salary. Legislation was passed in 1972 to forbid this trade; however the fines are small, and have little dissuasive impact.

Key Events

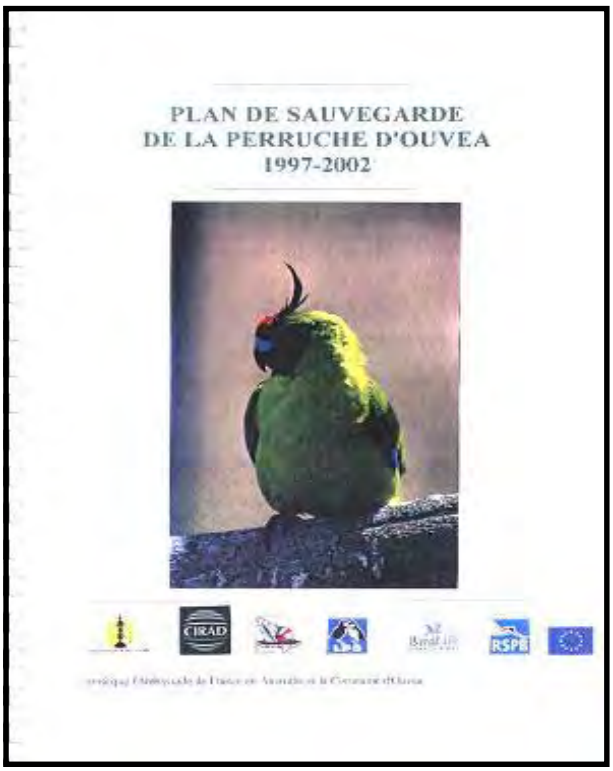
Human activities are commonly the cause of declines in wildlife populations. The conservation of a species is also frequently dependent on the vision of one or two people; this was the case for the Ouvéa parakeet. Olivier Robinet was the vet on the Loyalty Islands in 1993, salaried by the Province. Not only did he recognised the plight of the Ouvéa parakeet, but also that the conservation of the species had to begin by convincing the influential people of the island. The Province were prepared for him and his technician to work on this species.

The creation of the Association for the Conservation of the Ouvéa Parakeet made it possible to bring on board the owners and managers of the land, i.e. the chiefs of the tribes, particularly the traditional high chief who became the chairman, without whom no conservation could be done. Local politicians who could finance the plan and scientists who could provide the methods on how to gather the necessary information about the species were also included. The scientists were part of the French agricultural development organisation (CIRAD). These scientists were interested in wildlife, even though it was not the number one priority of their work. They were able to put on their work plan the study of several world endangered species found in New Caledonia, including the Ouvéa parakeet. With their support, Olivier Robinet began his PhD on the species. Towards the end of three years work it became clear that one means of extending the work on the parakeet would be through the preparation of a species action plan.

Species action plans in France generally have this procedure. The species selected, at the request of the Ministry of Environment, are those on the French Red Data list. The choice is validated by the national committee for nature protection, and the Plan is funded by the Ministry, with a yearly evaluation by experts.

At a European level the species for which plans have been written are the globally threatened species on Annex 1 of the European Union's Wild Birds Directive. They are validated by the EU's Ornis Committee, and actions are often funded by the European Commission's budget line LIFE.

The action plan for the Ouvéa parakeet was launched by the conviction of a small group of people who considered it was essential to start some conservation action for this endemic species. Getting Melanesians and metropolitan French to work together on such an issue after the serious political troubles in 1988 was no mean feat.



The starting point was the creation of the association for the conservation of the parakeet. Its aims turned out to be essentially the basis for the objectives for the species action plan.

After working on his PhD for 3 years, it became clear to Olivier Robinet that it was necessary to have a species action plan written by international experts, in order to give it credibility and acceptance by the chiefs and politicians of the Islands Province.

In 1996, a 3-day seminar was organised by Olivier and the CIRAD, bringing in international experts in bird conservation, particularly on pscittasidae, from the South Pacific, Europe and New Caledonia. Various sources of funding were found.

Organisations present:

- New Zealand Department of Conservation (experience on parrots)
- Wildlife Branch Tasmanian Parks and Wildlife Service (orange-bellied parrot)
- Vogelpark Walsrode, Germany (bird park in Tonga)
- BirdLife International
- Ligue pour la Protection des Oiseaux/ BirdLife France
- Environment Service Province Sud, New Caledonia Province des Iles Loyauté
- CIRAD Wildlife Programme

Recovery Plan

Main objectives

1. Taxonomy (We Ming Boon, Auckland University, New Zealand + Victoria University, Australia)
2. Illegal trade – CITES meeting 1999
3. Captive breeding
4. Habitat protection and enhancement
5. Translocation
6. Predator control and prevention
7. Legislation
8. Population assessment and monitoring: 1993, 1998, 2000
9. Nest site management
10. Public Awareness

A survey of nest sites uses GPS, in order to locate nest sites to monitor breeding success.

Population Assessment and Monitoring

Objective: To determine population trends by developing a repeatable census method which incorporates local knowledge and baseline data gathered to date.

Methods will be:

- Annual monitoring during the breeding season – December.
- Fixed line transects established at 2-3 representative sites.
- Monitoring to be conducted by local people able to identify the species by sight and call, this will be co-ordinated by the project officer.

Surveys conducted:

- 1993 – estimated 500 birds (+/- 200); few individuals in the south part of the island.
- 1997 - problems of access to the main areas due to conflict with tribes, survey postponed.
- 1998 – second survey estimated 800 birds (increase due to change in observers, not a real increase in numbers), population increasing in the southern part of the island
- 2000 – population stable in north, small increase in the south.

Local people in the surveys were paid for their time.

The young birds are ringed.

There is a spreading of introduced bees into trees being used as nest sites for parakeets. Attempts are being made to control them when they interfere with parakeet nesting holes.

Public Awareness

Major investment has been put into raising the awareness of the local people since 1994 about the plight of the parakeet, providing information about the biology of the species and efforts that could be made for the conservation of its habitats.

In 1997 the conservation society started a newsletter called *Baginy* (next page), with as wide a distribution as possible. Each year the society mans a stand at the fair on the island where T-shirts, postcards etc are sold and information


BAGINY

Bulletin de l'Association pour la Sauvegarde de la Perruche d'Ouvéa

N° 14 Décembre 2000

Le mot du Président :

provided about the species. French national TV came to prepare a programme on the parakeet, and made cassettes of the programme available for schools. It was recognised that there was a need to employ someone to devote his time to the work of awareness raising.

In 1998 a website was created www.netacces.com/aspo. An article was written in National Geographic Magazine. A second person was taken on for the awareness raising work.

In 1999, information panels on the species were prepared and first placed in the Province administrative buildings and then transferred to the airport, together with a statue of Ouvéa parakeet. A coloured brochure on the species was published.

In 2000, carstickers were prepared (right). Increasing numbers of tourists were requesting the Conservation Society for guides to show them the parakeet; these guides were receiving payment.

Evaluation of the species action plan

In November 2002, a meeting was planned to bring together the experts who had contributed to the preparation of the action plan, in order to evaluate the work done over the past 6 years.

There was a change over in personnel and a new vet joined; so this meeting has been postponed until autumn 2003

Here is an evaluation of *before* and *after* the action plan.

***Before*:** Endemic genus to New Caledonia, subspecies *Eunymphicus cornutus uvaeensis*
***After*:** Endemic species *Eunymphicus uvaeensis*. Work on the taxonomy of the species resulted in it being recognised as a species.

***Before*:** IUCN category – subspecies
***After*:** IUCN category – Endangered
After being defined as a species, it has been categorised as Endangered using the IUCN criteria.

***Before*:** CITES Appendix II
***After*:** CITES appendix I. To stop the illegal trading in the species it was moved on to Appendix 1 of CITES.

***Before*:** 1993 : estimated numbers c.500
***After*:** 1998, 2000 : estimated numbers c.600-800. The surveys have shown that the numbers have stabilised around 6-800. There has not been an increase except in the small population in the southern part of the island

***Before*:** Money through illegal trade
***After*:** Money through conservation and tourism
The illegal trade has not completely stopped, but increasingly opportunities are arising of earning money through the conservation of the parakeet. The Province is putting an increasing amount of money into the conserva-

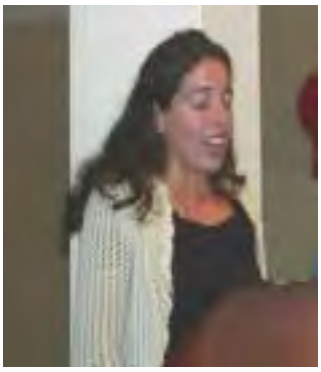
tion of the parakeet.

***Before*:** Little awareness of the value of the species
***After*:** Increased awareness of the plight of the species. Symbol of the island – airport, inflight magazine

The effort of co-operation between French, foreign conservationists and Melanesians has been a success. Most importantly credit should be given to the island authorities, *Province des Iles Loyautés*, who have been far sighted in the financing of these conservation actions.

Ascension – focus on dealing with invasive species

Tara George and Richard White, Conservation Officers, Ascension Island



George, T. & White, R. 2003. Ascension – focus on dealing with invasive species. pp 155-160 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Ascension Island was discovered a little over 500 years ago, at which time is was home to millions of seabirds, ten species of endemic plant and two species of endemic land-bird. The island has been permanently settled since 1815. With the arrival of humans came many non-native species of animal and plant. The impact of some of these non-native species on native plants and animals has been dramatic, and today the two endemic species of land-bird are extinct, four species of endemic plant are extinct and seabirds number less than a quarter of a million pairs. The impact on less well known taxa, such as invertebrates, is unknown. The Ascension Island Management Plan (AIMP) was produced by the Royal Society for the Protection of Birds for the Island Administrator in 1999. One of the main aims of the management plan was the control or eradication of non-native species, such as feral cats, rats, donkeys, sheep and Mexican thorn. In 2002, with a grant from the Foreign and Commonwealth Office, two of the key recommendations of the AIMP were implemented. Firstly, two Conservation Officers were appointed to look after the wildlife interests of the island and second, a team of specialists was contracted to undertake feral cat eradication on the island.

Tara George, Ascension Island Government Conservation Officer, Conservation Office, Georgetown, Ascension Island, ASCN 1ZZ. conservation@atlantis.co.ac
Richard White, RSPB Conservation Officer - Ascension Island

Introduction

Ascension Island is one of the lesser known UK Overseas Territories. It is situated in the South Atlantic Ocean Latitude 7°57 'S Longitude 14° 22'W, and consists of a single island with a few tiny off-shore stacks. The nearest island is St Helena, situated some 1,300 km to the south, and the nearest large land-mass is the continent of Africa, situated some 1000 miles east. Ascension was discovered in 1501. However it remained uninhabited until 1815, when a garrison was stationed there as a result of the imprisonment of Napoleon on St Helena that same year.

Ascension remained an island without a people, developing a role as a military and communications post in the South Atlantic. Last year saw the first attempts to change this status, with the election of an island council – an advisory body representing those who live on Ascension. These embryonic stages of democracy spearhead the initiation of private land ownership and permanent residency on the island.

Ascension is, geologically, a relatively young island, with estimates that the most recent volcanic eruption occurred a mere 1000 years ago. Because of Ascension's geological youth, it does not boast high levels of biodiversity. However its geographical isolation inevitably has led to endemism. Ascension's endemics include: 10 plant species (4 of which are now extinct); 8 inshore fish species; 26 invertebrate species; and 1 species of bird.

Non-endemic flagship species also find refuge in this isolated territory. Ascension's beaches provide the second largest nesting site for green turtles in the South Atlantic, and its terrain host large numbers of the native land crab. Its shoreline and offshore stacks similarly provide a welcome home for 11 species of seabirds.

This presentation focuses on the effect of two of Ascension's alien invasive species – *Prosopis juliflora* (Mexican Thorn) and feral cats.

Ascension Goby – one of Ascension's endemic fish

Green Turtle – Chelonia mydas

Alien invasive species and their effect on the Green Turtle *Chelonia mydas*

Background

The 32 beaches that surround Ascension's coast host one of the most important breeding populations of the Green Turtle in the world. There has been a Darwin Initiative project run from University of Wales, Swansea to study these turtles over the past 4 years,. This has included the implementation of a long term monitoring programme. Figures show that last year as many as 5,000 turtles laid up to 17,000 nests in total. Green turtles spend the majority of time feeding in coastal sea grass off the coast of South America and return to Ascension as adults to nest once they have attained sexual maturity (around 20-30 years).

Outline of main threats – highlighting Mexican Thorn

Threats to turtles from alien invasive species	**Dealing with these threats.**
Mexican Thorn - *Prosopis juliflora* – invading beaches • Alters insolation and consequently incubation temperature of sand • Alters sand hydrology and oxygen availability • Vegetation line will reduce the area available for nesting	Programme to keep turtle nesting beaches free of Mexican thorn
Humans • Artificial lights near turtle beaches may cause failure to lay • Disorientation of emerging hatchlings • Uncontrolled viewing and photographs can cause turtles to abort nesting attempts • Sand removal from beaches lowers height of beach • Uncovered pipes etc. can trap nesting turtles	• Most of the lighting has been changed to sodium vapour lights. • Conservation Centre runs turtle tours twice a week • Leaflets contain information about viewing turtles issued at airhead • Sand removal still an issue being debated • Pipes removed by organisations – e.g. USAF • Establishment of protected areas.
Feral Cats Patrol beaches and eat hatchlings	• Seabird Restoration Project – eradication of feral cats.

Clearing pipes from Turtle nesting beaches

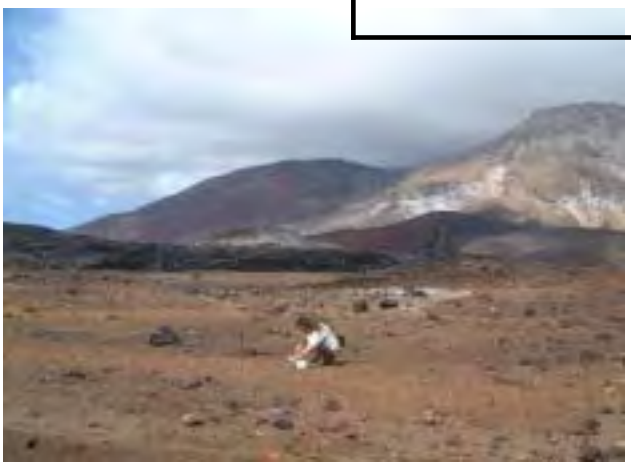
Euphorbia origanoides –
Ascension's only flowering endemic

Alien invasive species and their effect on endemic plants

Before man settled Ascension, there were very few species established. At the time of discovery there were probably only about 25 indigenous species, 10 of which were endemic. Of the 25 indigenious species, only 21 are found on Ascension, and 4 of the endemic plants have become extinct. The vegetation of Ascension is now dominated by plants that have been introduced by man. Some of these plants have become invasive, and the most recently introduced Mexican thorn poses the largest threat.

Outline of main threats – highlighting Mexican Thorn

Threats to endemic plants from alien invasive species	Dealing with these threats.
Introduced plant species •Compete with endemic plants •Eg (1) introduced Greasy grass *Melinis minutiflora* was responsible for out competing the endemic grass, *Sporobolus durus* (now feared extinct) •Increased rainfall – alters climate. •**Mexican Thorn** – grows in conditions similar to that of Euphorbia	•Lack of information about species •Long term monitoring initiated •Study of Ascension spurge by USAF •Attempts at propogation •Creation of seed banks •Mexican thorn controlled in known locations of endemic plants.
Humans •Introduce feral animals •Introduce competitive plant species •Building roads through Euphorbia colony	•Public awareness programme in place •Spurge plants being grown in nursery for sale. •USAF commissioned study pre-road. •Establishment of protected areas
Feral animals Grazing by feral sheep, goats and donkeys.	•Also potentially beneficial in limiting the growth of invasive species, and thus limiting competition. •Goats eradicated decades ago



Alan Gray – commissioned to study Euphorbia origanoides *on Ascension*

Alien invasive species and their effects on invertebrates

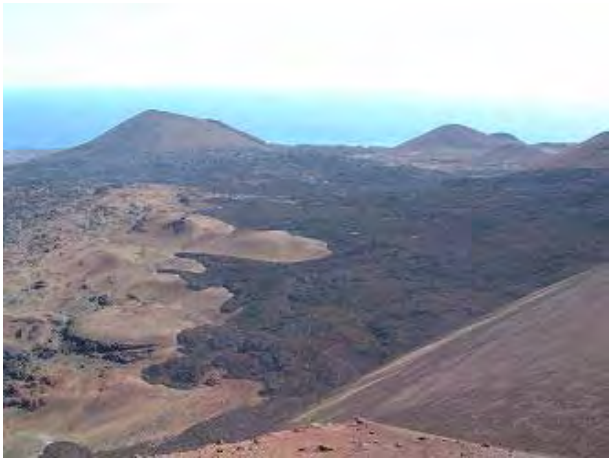
Until recently, very little was known about the native terrestrial invertebrate fauna of Ascension. In 1995, a study by Phillip and Myrtle Ashmole revealed that there are 298 species in total of which 26 are endemic and 147 introduced.

Endemic pseudoscorpion from Boatswainbird Island

Outline of main threats – highlighting Mexican Thorn

Threats to invertebrates from alien invasive species	Dealing with these threats.
Introduced plant species •Increase shading and thus ground temperatures •Increase rate of soil formation •Increase populations of non-native invertebrates •**Mexican Thorn** – growth rate so fast it poses the larges threat of all introduced plant species.	•Lack of information still about the invertebrates •Only species identification information exists •Small scale Mexican Thorn control in place.
Humans •Destruction or disturbance of habitat •Chemical poisoning	•All new land development will have EIA. •Organisations responsible for appropriate methods of disposing of chemicals.

Lava flow from Sisters Peak – site of the most recent volcanic eruption on Ascension



Alien invasive species and their effects on important geological features

Ascension is the tip of a volcano about 60km in diameter. The oldest rocks are around 1.5 million years and the youngest around 1,000 years. It is host to a number of volcanic features including scoria cones, erosion caves, dykes, and obsidian. All of these and more make the island a geologists paradise.

Threats to geological features from alien invasive species	Dealing with these threats.
Introduced plant species •Obscure physical form of the feature •Alter the typical landscape •**Mexican Thorn** – growth rate so fast it poses the larges threat of all introduced plant species.	•Removal of invasive plant species from geological features designated as protected areas. •Further studies needed.
Humans •Destruction by recreation activities	•Establishment of protected areas

Ascension Management Plan

All of the issues mentioned in this document are dealt with cohesively in an Ascension Management Plan which was drawn up in 1999 by the RSPB.

Due to numerous political and structural changes in the way that Ascension is run, the document is due up for review this year, however its role in formalizing and prioritizing conservation issues on Ascension is invaluable.

Seabird Restoration Project

The RSPB went on to manage a FCO funded Seabird Restoration Project which began in the latter months of 2001. The focus of the project was the eradication of cats, in an attempt to restore seabirds to the mainland.

Cats were introduced to Ascension in 1815. They quickly established a feral population and predated the vast seabird colonies found on the mainland at that time. Two landbirds, a night heron and a flightless rail, are known only from sub-fossil remains and a sighting by a 17th century visitor. It is not known when these species became extinct, but cats most likely contributed to or caused their decline. Evidence of the impact of feral cats on seabird populations can be seen in the numerous middens of bones and feathers that litter the landscape of Ascension (photo to right).

As a result of the presence of cats, seabirds have withdrawm from nesting on mainland Ascension (with the exception of the Sooty Tern) and are limited to offshore stacks, the largest being Boatswainbird Island. The table below shows the number of birds that nest around Ascension today, and demonstrates their global significance.

In 2001, with funding from the Foreign and Commonwealth Office, a feral cat eradication programme started. The main aim of this programme is to create suitable conditions to allow seabirds to recolonise the mainland of Ascension Island. The feral cat eradication programme employed a team of seven personnel for one year. During that year:

- 350 cat traps were deployed for a total of 40,500 trap nights
- 4,000 bait stations were deployed
- Over 70,000 poison baits were placed
- An estimated total of 750 feral cats have been killed by the programme

The programme was ambitious in that it attempted to keep pet cats on the island. To do this, all domestic cats were registered, neutered and microchipped. All cats trapped were scanned for the presence

The breeding seabirds of Ascension Island

	Ascension population	% breeding on Boatswainbird	% Atlantic population	% world population
Ascension frigatebird	3,000 pairs	100	100	100
Masked booby	4,000 pairs	99	50	Not known
Brown booby	900 pairs	40	30	<1
Red-footed booby	15 pairs	80	10	<1
Brown noddy	400 pairs	0	30	<1
Black noddy	10,000 pairs	75	50	3
Fairy tern	2,000 pairs	80	50	1
Sooty tern	200,000 pairs	0	70	<1
Red-billed tropicbird	500 pairs	95	20	5
Yellow-billed tropicbird	1,000 pairs	90	35	3
Madeiran storm-petrel	1,500 pairs	100	Not know n	Not known

Seabird ghost colony at Sisters Peak

Boatswainbird Island

Ascension Frigatebird

Poison bait station on coast near Boatswainbird Island

of a microchip to distinguish between feral and domestic animals; and poison bait was only used beyond 1 km from settlements, where all cats were assumed to be feral.

The successes of the project came earlier than initially anticipated in that before total eradication

Sooty tern colony

of cats, seabirds were already starting to nest on the mainland. Four of a possible nine seabird species have recolonised the mainland in the first year of the project. This is the first time in over a century that these species have bred successfully on the mainland. The figures to date stand at:

- 20 brown booby territories, seven of which have fledged young
- 3 masked booby territories, two of which fledged young
- 5 yellow-billed tropicbird territories, three of which fledged young
- 1 brown noddy territory

Masked booby chick on the mainland at Cocoanut Bay

In addition, sooty terns had a very successful breeding season in 2002, with low adult mortality and high productivity.

It looks as if the Seabird Restoration Project will be able to be viewed as a successful eradication of an invasive species. There are still sightings of cats being recorded however; so we will wait in anticipation for the declaration of a feral cat free island, and observe with vigilance the consequences that has on seabird populations on Ascension.

Cayman Blue Iguana Management Plan

Fred Burton

Burton, F. 2003. Cayman Blue Iguana Management Plan. pp 161-166 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

In November 2001 the IUCN Iguana Specialist Group met in Grand Cayman, and worked with the National Trust for the Cayman Islands and other local stakeholders to create a Species Recovery Plan for the critically endangered Cayman Blue Iguana.

A little over a year later, grant income to the Blue Iguana Recovery Program has increased from *ca* $6,200 per annum to $40,000 in 2002, and human resources applied to the programme locally have increased tenfold. Technical support from overseas has increased dramatically, and the Blue Iguana has gained a high profile among US zoos and conservation groups.

Fred Burton, UKOTCF - Cayman Islands, P O Box 10308 APO Grand Cayman. fjburton@candw.ky

The Cayman Islands are three very small islands, strung out along a couple of hundred kilometres of submarine ridge, on the southern edge of the N. American tectonic plate. The Brac is 200 km from Cuba and Jamaica. Grand Cayman is even more isolated at 280 km from Cuba and 300 km from Jamaica. There were no past "land bridge" connections to larger islands or the mainland.

For the last 12 years, the National Trust for the Cayman Islands has been running a conservation programme for the Grand Cayman Blue Iguana *Cyclura nubila lewisi*, a subspecies endemic to Grand Cayman. The Blue Iguana is a stunning creature. It is a giant blue lizard, growing to 5 ft (1.5 m) long or more, with red eyes, and a colour which varies from dark grey to denim blue depending on temperature and arousal.

It is the most critically endangered of all the West Indian rock iguanas. It is a classic story of an island endemic fallen

victim to non-native predators, land-use changes, hunting, trapping, and fast cars. There are only about a dozen individuals left from the original wild population.

Conservation actions began in 1990, led by NTCI. When we started this programme, information about the wild Blue Iguana population was almost non-existent. It took us years to get a handle on where they were, and how many were left. Meanwhile we developed captive breeding techniques, and began trial releases into protected areas. We started with a single pair returned to Cayman from the USA, and bred 6 young the very first year. By the year 2000, we had restored a small breeding population in the QE II Botanic Park, but at the same time we had worrying indications of ongoing decline in the wild population.

Blue Iguanas mate in April and May. This is a pair of released captive: the smaller female subsequently laid 8 fertile eggs.

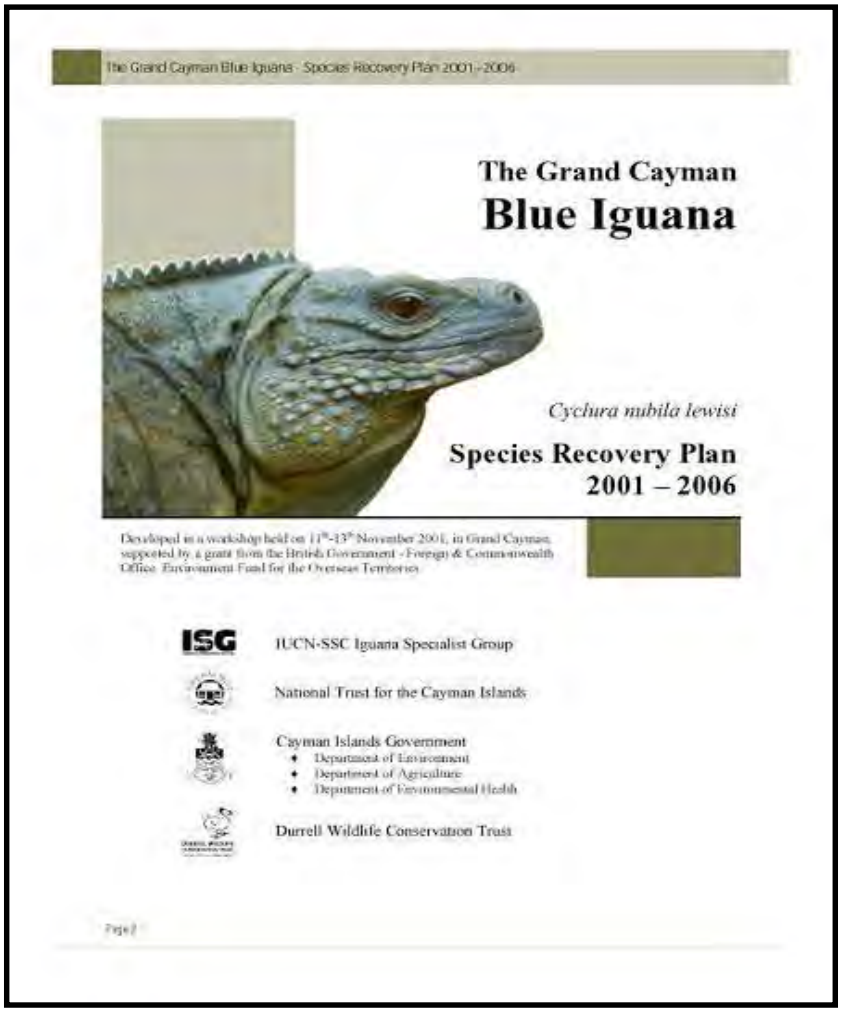
Back then I was directing all the Trust's environmental programmes, and could spend at most 8% of my time on the Blue Iguanas. We had half a dozen programme volunteers, and we were paying 1 hour a day to a Botanic Park employee to feed the captives. It just was not enough.

What we needed was to pull in a lot more human and financial resources, and to develop a much more ambitious strategy, which could actually make a serious difference. So, with a grant from the FCO's former Environment Fund for Overseas Territories (EFOT), we offered to host the 2001 annual meeting of the World Conservation Union's (IUCN) Iguana Specialist Group. We persuaded the participants to stay on an extra two days to help develop a formal Species Recovery Plan for the Blue Iguana.

That exercise cost US$ 17,500 - which was a lot cheaper than it could have been because most of the participants had budgeted to attend the ISG meeting anyway, so we didn't have to pay. We should also consider that the exercise cost several days time from over 30 busy professional people, local and from overseas. These planning exercises are expensive in more ways than one.

A year and four months has passed. I now want to take a look at what return we have seen from that

effort and expenditure.



First up, we have a plan. It says we are going to restore a wild population of the Grand Cayman Blue Iguana sufficiently to remain viable in the long term. And it lays out how we are going to do that, down to the specifics of who will do what, by when. So now we are implementing that plan.

It is impossible to present in this short time frame the details of the plan, and the itemized degrees to which we have achieved the tasks set. I have brought a few copies of the SRP if anyone wants to take a closer look at the detailed plan itself. Instead of the detail, I want to give you a feel for how the entire program has been transformed in the wake of that planning workshop.

One way of looking at it is to look at the money. From 1991 to 2000, the average program income was $6,200 per year. From 2001 to the present, the average income has been $40,000 per year. That is more than a five-fold increase. Mind you, saving

Searching: Quentin Bloxam, *Durrell Wildlife Conservation Trust*

Maintaining: Desiree Ebanks, *Iguana Warden*

the Blue Iguana is ultimately going to cost about $8 million, so we still have a way to go! I can say with confidence, we could not have accessed more than a fraction of that increased grant income, without the backing of an internationally endorsed Species Recovery Plan.

Another measure is the staffing level. I am now working on the programme full time, albeit as a volunteer for now. My successor at the Trust, Dr Mat Cottam is now giving the program the 8% or so of his time that I used to be able to spare. We also have a part-time Blue Iguana Warden taking care of the captive facility. That is more than a tenfold increase in local human resources dedicated to the programme.

Harder to quantify is the hive of activity in a whole network of overseas partners and supporters, which has grown enormously since the meeting.

This has all translated into a surge of programme activity. We gathered an international volunteer crew to re-survey the remnant wild population, coming up with the shock result I gave you at the start, 10-25 left in the wild. We hosted a master's student who came up with a rich vein of information relevant to managing released populations. We doubled the capacity of the captive breeding facility for juveniles, and quadrupled the capacity for breeding adults. We have an all-time record of 30 hatchlings being head-started from last year alone. This year is "the year of the Blue Iguana" in the Cayman Islands, with a wave of public education and awareness initiatives (see picture on next page).

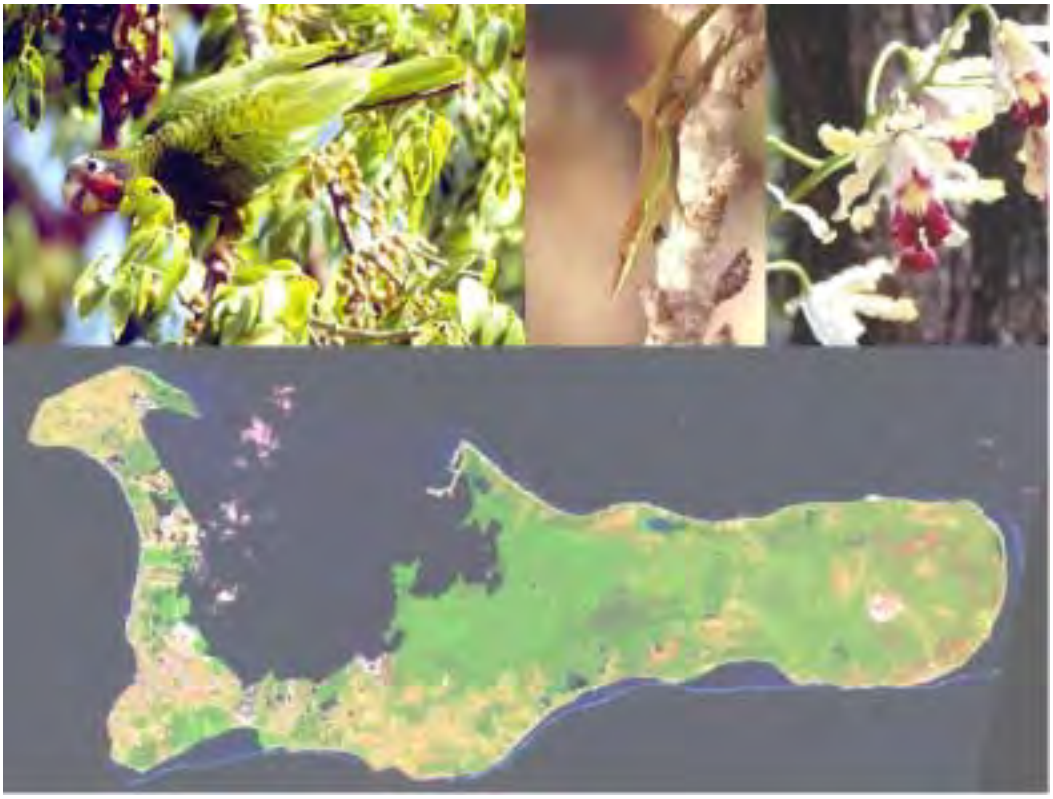
Obviously, $17,500 spent on a species recovery plan workshop has paid off handsomely.

Will it save the species? Well, the Recovery Plan has set the stage. We have some momentum now,

Monitoring: Rachel Goodman, *University of Tennessee*

but have to keep pushing harder and growing faster until we really do have the capacity to save a species. Still ahead, somehow we have to fund purchase of some 450 acres of privately owned land, to protect and manage enough area to restore and support 1,000 wild Blue Iguanas. We have to set up sustained income systems to support a core project staff for the long haul. The costs are going to make $40,000 a year look pretty inadequate.

Of course, saving the Blue Iguana for 8 million dollars will also save a host of other equally important wildlife. The same habitat we need to protect for the flagship Blue Iguana, will protect all the biodiversity of Cayman's xerophytic shrubland communities, which is very poorly represented in protected areas at the moment. The conservation awareness generated will resonate through the local community. The international attention will influence government environmental policy. Working to save a species is, in reality, much more than that.



To close, I just want to generalize a bit about Species Recovery Plans and their implementation, based on my own experiences with several of these.

Successful implementation of any strategic

plan depends hugely on the quality of that plan, and that depends critically on the selection of participants and the preparation for the originating workshop. The seeds to success or failure of implementation are usually sown very early in the planning process.

Species Recovery Plan workshops can be tremendously effective, as I have found for the Blue Iguana, but conversely they can sometimes be a waste of precious resources. Because international workshops are expensive and conservation funding and staff time are scarce resources, it pays to be careful and selective in their use, to pick the subjects where absence of formal planning can be seen to be a real obstacle to progress. Strategic planning is a tool, and like any tool it is only useful when it is applied to the right material, in the right way.

One of the hardest things in small island situations where conservation workers are often few and far between, is to bring all the relevant local players to the table for two or more days at a time. If it is really impossible to involve all the key players, and senior decision-makers from all the relevant stakeholder groups, it is almost impossible to generate a complete and authoritative plan. And trying to implement an incomplete plan can be a frustrating experience!

To survive, this beast is going to have to become a major conservation symbol. It's got the looks, it's got the charisma, and sadly it's got the crisis appeal.

Now it needs the promotion, the serious funding, and a lot more hard work.

A conservation plan involving sustainable development with local community – North, Middle & East Caicos Ramsar site & surrounds

Ethlyn Gibbs-Williams, Executive Director, Turks & Caicos National Trust

Gibbs-Williams, E. 2003. A conservation plan involving sustainable development with local community – North, Middle & East Caicos Ramsar site & surrounds. pp 167-176 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

This reports on the major project to develop a management plan for the fourth largest UK Ramsar site and its adjacent areas. The work was led by the Turks & Caicos National Trust, the UK Overseas Territories Conservation Forum and CAB International, in conjunction with the local community and in partnership with TCI Government. The project was supported by the Defra Darwin Initiative and FCO. The resulting *Plan for Biodiversity Management and Sustainable Development around Turks & Caicos Ramsar Site* was established as a document and process in 2002. It aims both to fulfill an international commitment, and provide the infrastructure for the community to be able to sustain itself by conserving and showing the heritage. This plan analyses the needs for conservation, and includes actions such as trail development, as specified within the plan, as having positive environmental impact, and indeed as a core element of the strategy.

Ethlyn Gibbs-Williams, Turks & Caicos National Trust, PO Box 540, Butterfield Square, Provenciales Turks & Caicos Islands. tc.nattrust@tciway.tc

The Turks and Caicos National Trust is a specially created non-governmental membership organization established by statute by the Turks & Caicos Government, for the purpose of safeguarding the heritage of the Turks and Caicos Islands for present and future generations. The organisation is one of the lead agencies in conservation management in the country.

The management plan is a conservation initiative, the process of which got underway in November of 1999, spearheaded by the National Trust and its partners, namely the UK Overseas Territories Conservation Forum and CABI Bioscience, in conjunction with Turks & Caicos Government and the local communities. The management plan is an output from the Darwin Initiative Project, which formed a core of the work.

The purpose of the plan is to provide means by which the internationally important biodiversity and cultural heritage of the Caicos Islands can be treasured by local people and experienced by visitors without damage. The plan works through wide-ranging co-operative action with the local

Plan for Biodiversity Management and Sustainable Development around Turks & Caicos Ramsar Site

Version 1.00

This plan is an output from the Darwin Initiative project "Developing Biodiversity Management Capacity Around the Ramsar Site in Turks & Caicos Islands". The Darwin Initiative, which part-funded the work, is run by the UK Department of Environment, Food and Rural Affairs.

The organisations running the project were:

Turks & Caicos National Trust

UK Overseas Territories Conservation Forum

CABI Bioscience

The project was undertaken under a Memorandum of Understanding between the project partner organisations and the Government of the Turks & Caicos Islands

people, local Government and other institutional stakeholders, and deploys biodiversity and other heritage information for the long- term benefit of the Islands and their inhabitants. This will enable the local people to protect the area by generating sustainable usage involving eco-tourism-based activities as well as education.

Implementing the plan fulfils many of the UK and TCI Government commitments under the Ramsar Convention, the Convention on Biological Diversity and the Environment Charter.

The wishes of the local people have been sought and have been integrated throughout the development of the plan. This will continue throughout implementation.

The plan objective is to provide a practicable means to conserve the rich biodiversity and cultural integrity of the Caicos Islands, including the Ramsar Wetland of International Importance. And more specifically:

1. To provide a means by which the rich biodiversity and cultural heritage of the area can be appreciated and cherished by local people and experienced by visitors without harm to these ecosystems.

2. To facilitate the development of the capacity of local people to establish small businesses based on eco-tourism and traditional crafts, so as both to provide the economic incentive for item 1 and employment for local people, so that they no longer need to leave the islands to find work, thereby maintaining the communities and cultural integrity.

3. To provide means of coordinating the work, educating local children, residents and visitors and integrating the work into the National Physical Plan and the implementation of the Environmental Charter.

4. To use this experimental approach to provide an example to the widely spread small island communities, which are searching for ways of maintaining biodiversity and local culture while generating an income, so that these can be maintained - rather than surrendering to intensive development models imposed and driven by external investment, replacing local culture and control by North American/ European systems.

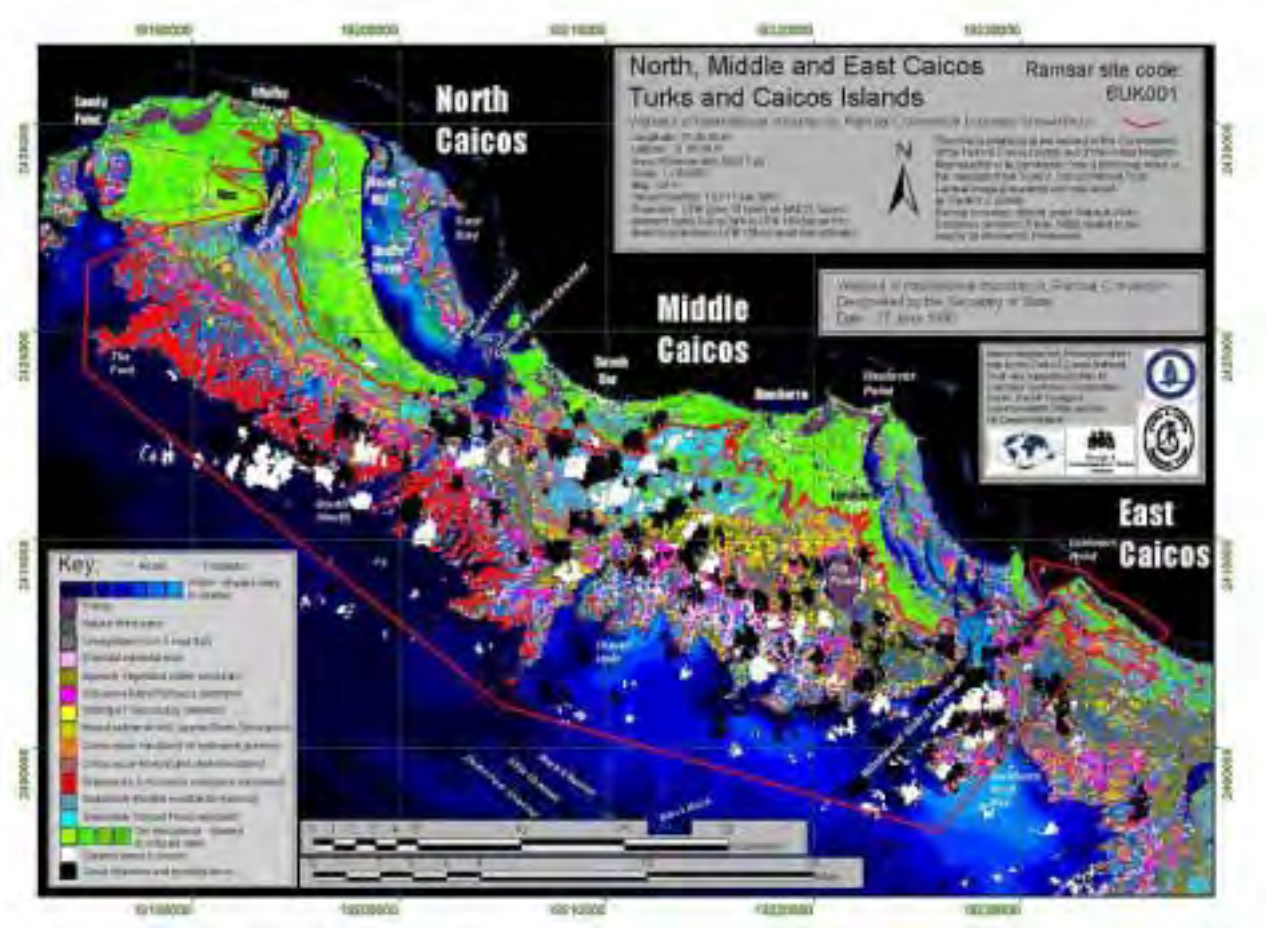
The plan lists sites, cultural features, and certain flora and fauna within the study area which provide opportunities for meeting the plan's objectives.

Flora, Fauna and Habitat

The plan continues the process as started under the Darwin Project of data collection on flora and fauna of the study area. However, even on the basis of the specimens and observations collected thus far, a number of priorities for sensitive conservation management are becoming apparent.

As well as species-level surveys for bats, birds, herpetiles, insects and plants (see below), the Darwin project has invested a lot of effort in developing a detailed and accurate habitat map for the study site in TCI. Knowledge of the distribution of habitats, as well as species, is vital for biodiversity management planning. Dr Fred Burton (Cayman Islands) co-ordinated the production of a habitat map for the project. A provisional map (based on satellite imagery) was prepared initially, and this was subjected to "ground truthing" over subsequent months. Fred, and Bryan Manco, both spent a great deal of time in the field, fighting through dense undergrowth in places, to check and record the locations of particular plant communities and the boundaries between habitat types. Dr Mike Pienkowski (UK Overseas Territories Conservation Forum, UK) also undertook some of this as well as spending many weeks analysing and refining the results, which were also used to provide an accurate map of the boundary of the TCI Ramsar site – information required by the TCI and UK governments. The detailed outputs of the habitat mapping exercise form an important part of the draft management plan developed by the project.

The main map is reproduced here to illustrate the



range and distributions of habitats across the study site.

The Darwin Project plant work led by Dr Gerald "Stinger" Guala and Jimi Sadle (Fairchild Tropical Gardens, USA) has provided valuable new information. Fred Burton and Bryan Manco have also collected many specimens for the project, and Kathleen McNary Wood (Providenciales) has provided valuable advice. Work is still ongoing to identify plant material collected under the Darwin project, but hundreds of specimens have already been mounted and processed for herbarium storage. These include a number of new records for TCI. Plants of particular interest in TCI include the palm *Pseudophoenix sargentii*. This has been seen in cultivation, but if a natural wild population could be located it would represent an important discovery. The orchid *Encyclia caicensis* is also of particular significance, as an apparent TCI endemic – at least half a dozen other plants may also be unique to the islands. Some of the plant material collected by the Darwin project can be viewed in the "virtual herbarium" established by Fairchild Tropical Gardens (www.virtualherbarium.org/lf/tci/tci.html).

Turks & Caicos Orchid
Encyclia rufa

At present there is more information on butterflies than any other insects. There are four butterflies, subspecies which are endemic to Turks & Caicos and southern Bahamas. Furthermore, a subspecies of Drury's Hairstreak *Strymon acis leycosticla* is found in Turks & Caicos only. Preservation of endemic species is a high conservation priority and the area in Middle Caicos along the Crossing Place Tril west from Conch Bar Village has been identified as important habitat for this endemic butterfly, giving that area higher conservation value than previously understood.

Drury's Hairstreak Strymon acis leycosticla

The extensive work carried out on butterflies is in the process of turning into a small book being written by Dr Oliver Cheesman and Richard Ground. Richard Ground also produced the book *Birds of the Turks and Caicos Islands*.

While the study did not reveal any indigenous amphibians, surveys indicate that the Islands support one endemic species of snake (Caicos Islands Trope Boa *Tropidophis greenwayi*). (This

species has caught the interest of National Geographic and a film crew will be visiting the Island of North Caicos next month (April 2003) to create a documentary of the species). Four species of lizard (Curly Tail *Leiocephalus psammodromus*,

Caicos Islands Reef Gecko *Sphaerodactylus caicosensis*, Pygmy Gecko *Sphaerodactylus underwoodi*, gecko *Aristelliger hechti*) and three subspecies and one snake subspecies, Rainbow Boa *Epicrates chrysogaster chrysogaster* represent Turks & Caicos endemic reptiles.

Conch Bar Caves entrance, a close-up of big-eared bat

Bats and their habitat were also studied. A complete management plan for Conch Bar Caves National Park has been developed which gives detailed guidelines for allowing access to the Caves (which are crucially important to the bats) while protecting the delicate geological features as well as the bat colonies. It entails limiting access to the caves only to people who are in the company of a trained, certified guide. The plan details the physical improvements needed, and recommendations that the designation be changed to Nature Reserve, and that it be transferred into conservation ownership to prevent any future development of the site.

The plan lays out in general terms the things to be taken into consideration for management of the other cave systems in the plan area, Indian Cave and other smaller systems in both Middle and East Caicos.

Fieldwork on wetland birds before and during the Darwin Project has shown that the TCI study area is very important to water birds and that usage is very variable. This variability is seasonal and year-to-year, and probably relates to weather conditions. Recent ecological studies indicate that bird populations survive only because the birds have a network of habitats available to them-none of these is surplus to their requirements. It is important that human intervention does not make things yet more

West Indian Whistling duck pair with young

complicated. West Indian species of waterfowl (ducks, flamingos, herons and shorebirds) are also losing habitat as tourism-related development expands in the region.

Work under the Darwin project has demonstrated that TCI is also much more important for dry-land species than had been appreciated. The dry forest and shrublands that occupy much of the higher ground, inland on Middle Caicos (and other islands), support important breeding populations of endemic and near endemic birds. These include the cuban crow *Corvus nasicus* (restricted to Cuba and the Caicos islands), a subspecies of the thick-billed vireo *Vireo crassirostris stalagmium* (endemic to the Caicos islands), and a subspecies of the Greater Antillean bullfinch *Loxigilla violacea ofella* (endemic to Middle and East Caicos). A number of other species are restricted to TCI and the Bahamas. In addition, the dry shrublands provide important wintering areas for birds that breed in North America, notably Kirtland's warbler *Dendroica kirtlandii*. This species, listed as *Vulnerable* by the IUCN, is one of the most threatened bird species of the region, with a world population of only about 3000 individuals. These dry scrubland forests are important also for many other plants and animals.

The plan looks at other TCI ecosystems, which have especially great value because in many cases they are as close to the natural state as any to be found on similar island systems in the American tropics. Within the wetlands, coastal mangroves are now recognized as one of the most productive systems in the world, providing rich nursery grounds for many commercial species. The important local fisheries for conch, lobster and bonefish depend on organic food material produced in mangrove areas. The complex transitions between natural ecosystems here are also of great importance.

The patchy *Pinus caribea* var. *bahamensis* woodlands, and the gallery forest adjacent to Wade's Green Plantation (North Caicos) have been identified as being of particular interest, and worthy of further investigation. In addition, the limited freshwater habitats appear to support locally rare botanical and animal communities, the value of which needs to be recognised in conservation planning.

Aerial view of parts of the lower flats and bank, with complex patterns of vegetation types

Historical and archaeological sites

Long-term archaeological work has been carried out on the Arawak sites within the plan area (finding artifacts such as those pictured above at the initial cleaning stage). A site (MC6), within the Ramsar site on the south of Middle Caicos, is considered to have been a major regional centre of pre-Columbian society, as were the caves on both Middle and East Caicos.

The Trust and the National Museum have both worked on the historic plantations, and this material will also be incorporated in trails and displays. One of the important sites, Wades Green Plantation on North Caicos is listed by UNESCO as one of the most significant slave sites in the region. All of the sites are both important elements of the TCI national heritage and potentially valuable educational and eco-tourism resources for which the management plan proposes various uses.

TCNT junior members visiting Wades Green historic plantation ruins

The plan identifies a number of traditional paths or field roads across the islands which link interesting places, through valuable habitat, culturally important plants and historic features. These field-roads are potentially valuable bases for interpreted and guided trails. The Haulover Plantation Field-road has been selected as the first in the plan to be developed in such manner.

Interpretation for field roads: *a programme of integrated leaflets (above), signs and displays matched to the opening of each trail or facility.*

One of the most positive aspects of the traditional crafts of the Turks and Caicos Islands is that the undertaking of the majority of them are sustainable practices. Craft products made of fanner grass and palmetto fronds are especially important, and both materials are traditionally collected in a sustainable manner. Local materials are also used in potentially important craft areas such as boat building (Caicos sloops).

In recognizing the beauty and importance of the native vegetation the plan is creating awareness,

Weaving a straw hat

Construction of Caicos Sloop

and the Trust has established a native plants nursery. The Government is concerned about the disappearing scrub forest, and wishes to work with the Trust and other botanical authorities to draw up guidelines for the replacement of native vegetation on sites cleared for development. Opportunities are now available for interested persons to train in native plant propagation which could lead to agricultural professions. The Trust is also labelling plant specimens at its sites so that visiting residents can make selections of native plants for their own properties based on what they see in these settings.

The Plan

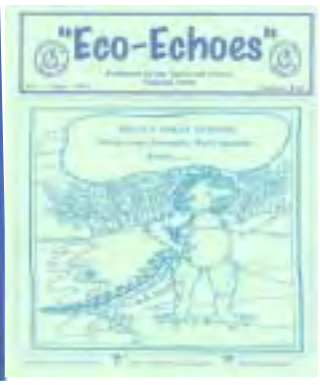
The plan is a work-in-progress and should be so for the duration of the management programme. It details in specific terms the elements that could be developed to allow access to the areas while affording protection to the environment.

Several factors are taken into account in developing a system of facilities for experiencing the heritage of the Caicos Islands. These include:

- The development of the system should be modular, so that some elements can become fully operational at an early stage.
- Even though modular, the scheme should fit a wider plan, so that the various elements will be integrated at later stages when more are in place.
- Trails and hides should cover a range of ecosystems and other interests.
- Wherever possible, historical and cultural features should be included as well as biological ones.
- Trails should incorporate a range of distances and challenges.
- Throughout, damage to the biological, historic and cultural heritage should be avoided. Indeed, the object is to conserve these.
- Usage should be monitored.
- Schemes to generate income should be implemented as early as possible, so as to support maintenance of existing facilities and the addition of more modules (following the example of the successful Little Water Cay Trails).
- Wherever possible, facilities should be related to Information Centres or other TCNT facilities, so as to enhance interpretation, aid supervision and provide a range of opportunities for visitors.

The plan identifies trails, boat trips and other sites which have potential for visitors, describes each, and details the work needed to make each usable or to improve usage. The same detail is prepared for facilities such as hides/blinds, the construction thereof and uses.

A variety of publications have been created and some are in process.



These publications help visitors understand more about the wildlife and the environment that they are experiencing.

The plan supports the establishment of visitor centres throughout the Islands. The TCI Government has donated the former school building in Bambarra, Middle Caicos and its land to the Trust for the development of an eco-centre. Part funding has been secured for the refurbishment of the building; additional funds are still needed in order to commence and complete the project. The plan includes exhibits such as:

- Outdoor exhibits dealing with traditional farming, medicinal plants, heirloom live-

stock, traditional building techniques, and traditional outdoor cooking demonstrations.
- Indoor exhibits with information about traditional crafts.
- Display cases holding items of cultural, natural and historic interests
- A reptile exhibit

Training and Environmental Education

Training will be provided for personnel recruited by the institutions to implement the plan. Environmental education work will centre on expanding the highly successful modular curriculum course in environmental education *Our Land, Our Sea, Our People,* developed by the Trust in consultation with the TCI Education Department and the Forum, with support from FCO. Trust-managed sites will be made available as living class-rooms. Junior conservation programmes will be developed for school-children to participate in conservation work in their communities. The potential for post-school education will be explored with the developing Community College curriculum.

Training will be provided for local people in skills needed to support the work, including trail-management, guide work, and the establishment and operation of small businesses compatible with, and supportive of, maintenance of the heritage and way of life.

Socio-economic aspects, Awareness and Marketing

There are considerable possibilities for local employment both in working for the Trust implementing and operating conservation and visitor facilities, and in related work providing for visitors. This kind of employment supports local communities and maintains their traditions and quality of life, rather than replacing this with a different (and, in many ways, unwanted) imported social system.

One of the main objectives of the plan is the creation of high-quality, low-impact tourism. Aspects of this area are already active, and it is important that growth is progressive at a rate that the local capacity can manage without damaging the communities themselves or the cultural and natural heritage features that provide the interest. There is a need to develop an integrated marketing strategy incorporating input from biodiversity and cultural management plans and socio-economic study.

Biological monitoring

The work of the Darwin Initiative project provided a baseline of information on a range of taxa. The more detailed results continue to be analysed by volunteer specialists involved. If problems are subsequently revealed, adjustments to the management plan can be developed to address these. Biodiversity surveying and monitoring will use a combination of volunteer outside specialists working with local people so as to produce the necessary information while transferring skills. Monitoring techniques are being developed and will be incorporated in the revisions to the plan.

Evaluation and revision procedures

The basic information allowing monitoring of the biodiversity of the area will become available from the techniques being developed. The monitoring of the management work done and its outcomes will be achieved by means set out in the Logical Framework in the document. The main features include:

- Regular meetings and reports;
- Scientific survey and monitoring to ensure the safeguarding of biodiversity;
- The development of a long-term financial plan
- Clear information on utilisation, from visitor centre records, tour fees and other ticket sales, records of school visits;
- Information on local businesses and demographics from TCI Government;
- Records of presentations, publications and web-visits;
- Formal project reporting.

Conclusion

Institutions

The Trust was created by ordinance in 1992, and given special powers to enable it to carry out conservation of TCI's historic and environmental heritage. The Trust Ordinance enables the Trust to own conservation properties and make them inalienable, so that they will be protected and held in trust for the people of TCI forever. It also gives the protection of the criminal law to all Trust

properties. These special powers make the Trust an ideal organisation to manage conservation lands, and its partnership with the Forum gives it an international resource base on which to draw.

The Department of Environment and Coastal Resources (DECR), within the Ministry of Natural Resources, is the TCI Government Department responsible for nature conservation, fisheries and related matters. Limited resources had prevented much progress on management of protected areas by official bodies. Because of this, the UK Department for International Development (DFID) have funded for several years a project (CRMP) with TCI Government to develop and implement management plans for three of the marine national parks, as well as building an environment centre in Providenciales, establishing an environment fund and funding in part some public awareness activities. With the ending of the project, the CRMP has transitioned into a protected areas department within the DECR. It is to be hoped that this official protected areas service will be able successfully to implement these three management plans and extend to other TCI marine national parks and some other protected areas.

This work is complementary to TCNT's expertise in terrestrial and wetland conservation, and the management of nature reserve and historic sites. There is considerable potential for collaboration and sharing of the major needs for conservation work in TCI.

The Conservation Fund

The TCI benefits from having a newly established Conservation Fund, funded by a 1% addition to the existing 8% accommodation tax. This fund provides a mechanism for ongoing funding for management of protected areas. The ways of implementing these intentions are still being developed, and it is crucial that, as guidelines for the uses of this fund are developed, it be used to protect the most critically important environmental and historic resources of the TCI. Access to this fund for carrying out elements of this management plan is essential.

Acknowledgements

The project partners would like to acknowledge the financial support of the UK Government's Darwin Initiative. Activities that have complemented and strengthened the Darwin project have received funding from the UK Government's Foreign & Commonwealth Office, and some flights have been subsidised under British Airways *Assisting Conservation* programme. ESRI supported in the form of mapping software. The TCI Government has provided project vehicles, and the Norbellis Foundation has assisted with accommodation and support to TCNT. Much of the survey and research work was undertaken by international specialists in unpaid time, and many people across the islands have also given up their time, to participate in fieldwork, planning meetings and workshops.

However, the success of the Darwin project in TCI has also benefitted from generous support from a range of institutions and individuals. We would also like to thank the Governors and their staff, the Chief Minister and Ministers for Natural Resources and their officers, especially in the Minis-

try of Natural Resources, the Department of Environmental and Coastal Resources, the Department of Economic Planning and Statistics, the District Commissioners and many other officials. The team are particularly grateful to the communities on Middle and North Caicos for making them so welcome and sharing their intimate knowledge of their islands.

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CAB International and the UK Overseas Territories (poster)

Oliver D. Cheesman

Cheeseman, O.D. 2003. CAB International and the UK Overseas Territories. p 177 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

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CAB International became a supporting member of the UK Overseas Territories Conservation Forum in 1998, but its work in the UKOTs goes back much further. Some of CABI Bioscience's recent work in the UKOTs is described in poster presentations included in these Proceedings. However, a general introduction to the organisation will help to put these into context.

CAB International (CABI) is a global non-profit organisation generating, validating and delivering knowledge solutions in the applied life sciences through information products and services and by utilising its expertise in biodiversity for the benefit of agriculture, trade and the environment.

CAB International is a treaty-level, intergovernmental organisation with 41 Member Countries. It began in 1913 as a London-based insect identification service supporting agricultural scientists. The service expanded, and in 1929 was formally constituted as the Imperial Agricultural Bureaux (IAB), becoming the Commonwealth Agricultural Bureaux (CAB) in 1948. In 1985, it was granted international status, becoming CAB International and opening its membership to non-Commonwealth countries.

CAB International is self-funded, deriving income from: publishing revenues; scientific and information services; member contributions; and contracted or sponsored research, aimed predominantly at problems in developing countries. It operates through two Divisions (Publishing and Bioscience) and the *Information for Development* Programme.

CABI Publishing is a leading applied life sciences publisher, producing and marketing worldwide a range of printed and electronic products within the areas of agriculture, forestry, natural resource management, socio-economics, veterinary science and related disciplines, including human health.

CABI Bioscience provides research, training, consultancy and other specialised services worldwide, with a particular focus on: sustainable agriculture; characterising, conserving and utilising biodiversity; managing environmental change; protecting the environment from the damaging effects of human activity, and building human capacity.

CAB International's *Information for Development* Programme assists developing countries in the acquisition and management of scientific information.

CAB International employs 450 staff at 9 Centres around the world: the corporate head office in the UK and offices in India and China; joint Regional and Bioscience Centres in Malaysia, Kenya and Trinidad; Bioscience Centres in Pakistan, Switzerland and the UK; and Publishing offices in the UK and USA.

Some of the UK Overseas Territories (Anguilla, Bermuda, British Virgin Islands, Falkland Islands, Montserrat and St Helena) together constitute a CABI Member Country, represented on CABI's Executive Council by the UK Government's Department for International Development. However, CABI's work in the UKOTs is not restricted to these countries, or to DFID's policy priorities.

The following poster presentation illustrates work conducted under the recent Darwin Initiative Project in the Turks & Caicos Islands, which has increased knowledge of local biodiversity and fed directly into a pioneering Management Plan for the terrestrial species and habitats around the Ramsar site in TCI (the full Management Plan is available on the UKOTCF website: www.ukotcf.org).

The following poster should be cited as:

> Cheesman. O. 2003. Butterflies of the Turks & Caicos Islands: their status and conservation. p 178 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Butterflies of the Turks & Caicos Islands: their status and conservation

Oliver D. Cheesman: CABI *Bioscience* UK Centre, Bakeham Lane, Egham, Surrey, TW20 9TY, UK. Email: o.cheesman@cabi.org

Introduction

The Turks & Caicos Islands, one of the UK's Overseas Territories, lie at the southern extreme of the Bahamas, in the West Indies. They contain a substantial Ramsar site (wetland of international importance), but their terrestrial biodiversity has been relatively poorly documented. These are low-lying, limestone islands, where conditions are relatively arid. A number of islands in the Turks & Caicos are largely untouched by major tourist development, and local residents have expressed a wish to preserve their natural and cultural heritage.

Figure 1: The Turks and Caicos Islands and neighbouring islands of the Bahamas (right); Terrestrial habitats of the Turks & Caicos (left) include dry scrub/woodland (foreground) and hypersaline mud flats (background)

A Darwin Initiative project, led by CABI *Bioscience*, the UK Overseas Territories Conservation Forum and the Turks & Caicos National Trust, has recently conducted biodiversity surveys across an area centred on Middle Caicos. Butterflies were selected for study, alongside other insect groups, birds, bats, herpetiles, and higher plants.

Turks & Caicos Butterflies

In one of the few published accounts of Turks & Caicos butterflies, Bob St Leger recorded 37 species (St Leger, 1983). Further study now suggests that 47 different butterflies are known from the islands. This figure is broadly consistent with the numbers expected from a group of islands of this size, and with the numbers recorded from neighbouring islands of the Bahamas: 22 from Mayaguana (Miller *et al.*, 1992) and 37 from Great Inagua (Clench & Bjorndal, 1980; Simon & Miller, 1986).

Family	Turks & Caicos representatives
DANAIDAE (Milkweeds, Monarchs)	3
NYMPHALIDAE (Fritillaries, Emperors, Admirals, etc)	9
HELICONIIDAE (Heliconias)	1
LYCAENIDAE (Blues, Hairstreaks)	10
PIERIDAE (Whites, Sulphurs)	12
PAPILIONIDAE (Swallowtails)	3
HESPERIIDAE (Skippers)	9

Table 1: Numbers of representatives of different butterfly families amongst the Turks & Caicos fauna

...their Status

It has been suggested that many of the butterflies of the southern Bahamian islands (including Turks & Caicos) originally came from Cuba and the northern Bahamas, with a small number originating from Hispaniola to the south (Clench & Bjorndal, 1980; Miller *et al.*, 1992).

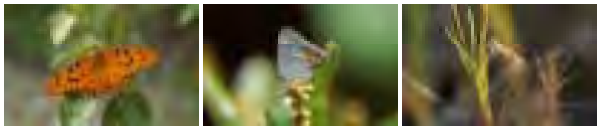

Figure 2: Amongst the Turks & Caicos butterflies that are relatively widespread in the West Indies are the Gulf Fritillary *Agraulis vanillae insularis* (left); the Cuban Grey Hairstreak *Strymon martialis* (centre); the Obscure Skipper *Panoqina panoquinoides panoquinoides* (right)

Whilst some are common and widespread in the region (see Smith *et al.*, 1994), a number of Turks & Caicos butterflies have very restricted distributions, and are only known from these islands and their immediate Bahamian neighbours (Miller *et al.*, 1992 - summarised in Table 2). Of particular interest is *Strymon acis leucosticha*, which appears to be endemic to the Turks & Caicos.

Butterfly	Distribution
Strymon acis leucosticha	Turks & Caicos
Memphis intermedia intermedia	Turks & Caicos, the Inaguas
Eurema chamberlaini mariguanae	Turks & Caicos, Mayaguana
Cyclargus thomasi clenchi	Turks & Caicos, the Inaguas, Mayaguana
Heraclides aristodemus bjorndalae	Turks & Caicos, the Inaguas, Mayaguana
Wallengrenia sp.	Turks & Caicos, the Inaguas, Mayaguana

Table 2: Endemic butterflies of the southern Bahamian islands (including Turks & Caicos)

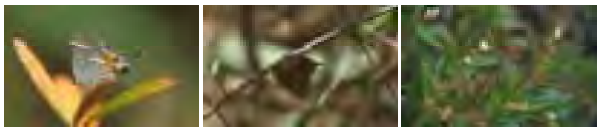

Figure 3: Amongst the Turks & Caicos butterflies with very restricted distributions are local subspecies of Drury's Hairstreak *Strymon acis* (left) and the Turk Island Leaf Butterfly *Memphis intermedia* (centre). Both are believed to use *Croton discolor* (right) as a larval food plant.

As well as clarifying the status of particular butterflies in the Turks & Caicos, observations made under the Darwin Initiative project are contributing to our knowledge of their ecology. For example, favoured nectar plants include *Stachytarpheta jamaicensis*, *Waltheria indica* and *Borrichia arborescens*.

...their Conservation

The specific conservation requirements of many Turks & Caicos butterflies are poorly understood. Whilst some are associated with disturbed habitats, and frequently occur around human habitations, others are associated with undisturbed scrub/woodland, or with the sparse vegetation of hypersaline habitats. Until further, specific information on the ecology of particular species is available, butterfly conservation in the Turks & Caicos is dependent on holistic measures.

As well as conducting biodiversity surveys, the Darwin Initiative project is putting in place a number of measures to further the conservation of biodiversity in the Turks & Caicos Islands. In consultation with the local community, a draft management plan for the study area is being developed. This recognises the potential of the area to attract modest numbers of eco-tourists, stimulating the local economy without causing substantial environmental degradation. Butterflies are amongst the attractions for such visitors, and a photographic guide to the local fauna is being prepared. A former school building in Bambarra, Middle Caicos, has been given by the Turks & Caicos Government, and it is planned to convert this into a study centre for visitors and local residents.

Figure 4: Darwin Initiative project personnel meet with Middle Caicos residents to discuss the development of a management plan (left); the Bambarra school building - a future study centre (right)

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Inter-country plan: marine turtles in the Caribbean UK Overseas Territories (TCOT)

Brendan J. Godley, Annette C. Broderick, Marine Turtle Research Group; Susan Ranger & Peter B. Richardson, Marine Conservation Society

Godley, B.J., Broderick, A.C., Ranger, S. & Richardson,P.B. 2003. Inter-country plan: marine turtles in the Caribbean UK Overseas Territories (TCOT). pp 179-183 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The exploitation of marine turtles in the Caribbean has generated an extraordinary level of international concern in recent years. Consequently, the CITES Hawksbill Turtle Range State Dialogue Process has led to a general agreement among Range States to work towards a regional management strategy for the hawksbill turtle in the Caribbean. In line with recommendations made through the Dialogue process, the UK Government has commissioned a three-year project to address critical gaps in the knowledge of marine turtle populations found in the UK Overseas Territories. The project, known as TCOT (Turtles in the Caribbean Overseas Territories), was launched in November 2001 and aims to assess the status and exploitation of the marine turtle populations found in Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Montserrat and Turks and Caicos Islands. This paper describes the partnership approach adopted by TCOT to implement habitat monitoring, genetic stock analysis, tagging and socio-economic survey programmes designed to meet the project's objectives in each Territory, and highlights significant findings to date.

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(http://www.seaturtle.org/mtrg/projects/tcot/)

Overview

The exploitation of marine turtles in the Caribbean has generated an extraordinary level of international concern in recent years. Consequently, the CITES Hawksbill Turtle Range State Dialogue Process has led to a general agreement among Range States to work towards a regional management strategy for the hawksbill turtle in the Caribbean. In line with recommendations made through the dialogue process, the UK Government has commissioned a three-year project to address critical gaps in the knowledge of marine turtle populations found in the UK Overseas Territories. The 3-year project, known as TCOT (Turtles in the Caribbean Overseas Territories), was launched in November 2001 and aims to assess the status and exploitation of the marine turtle populations found in Anguilla, Bermuda, the British Virgin Islands (BVI), the Cayman Islands (CI), Montserrat and the Turks & Caicos Islands (TCI). The project operates using a partnership approach with local organisations and is co-funded by Defra (UK Department of Environment, Food & Rural Affairs) and FCO Environment Fund for the Overseas Territories with substantial in-kinds coming from the original project consortium.

Project Goals

The specific goals of the project as outlined at the inception were to:

- Identify project partners and initiate monitoring projects incorporating an initial training programme.
- Assemble quantitative and socio-economic data on the harvest and uses of marine turtle populations.
- Assess current conservation status of, and trends in, marine turtle populations and their habitat.

- Determine by DNA analysis the genetic profile of the turtle populations in UKOTs and the origin of harvested animals.
- Provide an assessment of the sustainability of any harvest.
- Provide recommendations for the future conservation, monitoring and management of marine turtles in the UKOTs.

Beach Monitoring in Cayman

Project Structure

The project is co-ordinated in the UK by the Marine Turtle Research Group, University of Wales, Swansea and the Marine Conservation Society. Additional members of the project consortium donating their time from the outset were University of Wales, Cardiff (to undertake genetic analyses), University Western Ontario (to co-ordinate socio-economic aspects of the project) and both Cayman Islands Department of Environment and Cayman Turtle Farm (to support training initiatives by extensive collaboration including the co-hosting of a training workshop (see below)).

The Project coordinators have invested extensive effort into forging relationships with many collaborating organisations in the UKOTs in the belief that TCOT will only succeed through extensive co-operation. The growing list includes: **Anguilla**: Director of Fisheries, Anguilla National Trust; **Bermuda**: The Bermuda Turtle Project, The Government of Bermuda; **BVI**: Conservation and Fisheries Department, BVI National Parks Trust, H. Lavity Stout Community College, Island Resources Foundation; **CI**: CI Department of Environment, Cayman Turtle Farm; **Montserrat**: Montserrat Department of Agriculture, Montserrat Department of Fisheries, Montserrat Divers; Montserrat National Trust, Montserrat Volcano Observatory, Sea Wolf Diving School, **TCI**: Department of Environment and Coastal Resources, Centre for Marine Resources South Caicos, Turks and Caicos National Trust, Turks and Caicos Coastal Resources Management Project.

Project Activities and Outputs

The activities and outputs as we approach the midpoint of the project (1 May 2003) have been diverse and we summarise below.

Monitoring and Research
TCOT personnel have contributed towards fieldwork in all six UKOTs.

Ongoing nesting beach (picture above) and inwater monitoring by local partners is underway in all UKOTs (there is no nesting in Bermuda). This has been supported by methodological protocols drafted specifically for TCOT and the provision of tagging equipment by TCOT and WIDECAST.

Genetics sampling is underway in all UKOTs. This has been supported by equipment and sampling datasheets from TCOT.

Turtle fishermen and other members of the community, have been involved in the process at every opportunity (below).

Collaborating Turtle Fisherman Tony Lettsome (BVI)

James Gumbs gives Anguilla National Report.

Training and Capacity Building
An active network among biodiversity professionals dealing with turtles in the UKOTs has been created.

As part of each field visit *ad hoc* training has been provided.

In August/September 2002, a TCOT Training workshop was held in Grand Cayman with 24 delegates (1 from each of Anguilla, Bermuda, BVI, Montserrat; 2 from TCI; 12 from CI; 4 TCOT Personnel; and 1 WIDECAST representative). This ran for 5 days with national reports (above), theoretical and hands-on sessions dealing with nesting and inwater monitoring, nest excavations, in-water capture (below), measuring, tagging and genetic sampling. Training was also given in the administration and design of socio-economic questionnaires as well as fund-raising. Proceedings have been produced and distributed.

TCOT team has supported demand-led grant application writing with partners in Anguilla, BVI and Cayman.

We have supported the publication of three manuscripts by TCOT partners in *the Marine Turtle Newsletter*.

TCOT submitted a successful bid to the FCO Environment Fund on behalf of all 5 Caribbean UKOTs to fund the participation of one representative fieldworker from each UKOT in the Bermuda Turtle Project Training Course in August 2003.

Information Exchange/Awareness Raising
A project website has been established which allows key documents to be downloaded in pdf.

Two press releases have been circulated and numerous articles have appeared in the UK and UK Overseas Territories.

An e-mail discussion list has been instituted.

A comprehensive Bibliography of Marine Turtles in the Overseas Territories has been assembled.

An awareness leaflet '*Marine turtles & tourism: How you can help'* has been produced as part of the TCOT initiative, with additional support from UK marine turtle species 'champion', Cheltenham & Gloucester. This leaflet is being distributed to tourism centres in all UKOTs.

Jasmine Parker (TCI) and Sue Ranger (left) during in-water sampling training at the TCOT Workshop, Grand Cayman, August 2002

A diver participation survey programme, Caribbean Turtlewatch has been designed and is underway in all UKOTs (top of next page).

TCOT personnel have contributed to outreach initiatives wherever possible (bottom of next page).

Information regarding the TCOT project has been outlined at numerous UK conferences as well as the 22nd International Sea Turtle Symposium, Miami, April 2003; 23rd International Sea Turtle Symposium, Kuala Lumpur, March 2003 and the UKOTCF Conference, Bermuda, March 2003.

Caribbean Turtlewatch materials

As part of the reporting of the TCOT workshop in the Cayman Islands, two resource CDs have been produced which include all powerpoint presentations from the workshop, a range of fund-raising resources, a photograph library, TCOT Bibliography and scientific papers, as well as several International Sea Turtle Symposium proceedings, monitoring protocols and datasheets.

"Turtle Day" at BVI Environment Summer School

For more information on the project please see our website (http://www.seaturtle.org/mtrg/projects/tcot/) or contact the team on: info@tcot.seaturtle.org

Acknowledgements

We are grateful to the organisers and sponsors of the UKOTCF Conference for the invitation and support to present the project to such a diverse audience. Many thanks to all of our many colleagues and friends in the Caribbean Overseas Territories who have thus far made TCOT a gratifying success.

Green turtle
Foraging and nesting
IUCN: Endangered

Loggerhead
Nesting and foraging
IUCN: Endangered

Leatherback
Nesting and foraging
IUCN: Critically Endangered

OVERSEAS TERRITORY	LEGAL DIRECTED FISHERY	NESTING				FORAGING			
		Ei	Cm	Dc	Cc	Ei	Cm	Dc	Cc
Anguilla	*Moratorium*	✶	✶	✶		✶	✶	✶	✶
Bermuda					✶	✶	✶	✶	✶
British Virgin Islands	◆	✶	✶	✶		✶	✶	✶	✶
Cayman Islands	◆	✶	✶	✶	✶	✶	✶	✶	✶
Montserrat	◆	✶	✶	✶		✶	✶	✶	✶
Turks and Caicos	◆	✶	✶		✶	✶	✶		

KEY

✶ nesting/foraging population present

◆ legal directed marine turtle fishery

Ei: hawksbill turtle *Eretmochelys imbricata*

Cm: green turtle *Chelonia mydas*

Dc: leatherback turtle *Dermochelys coriacea*

Cc: loggerhead turtle *Caretta caretta*

A community-based management plan for the ormer *Haliotis tuberculata* (L.) in Jersey, Channel Islands

Andrew Syvret, Société Jersiaise

Syvret, A. 2003. A community-based management plan for the ormer *Haliotis tuberculata* (L.) in Jersey, Channel Islands. pp 184-189 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The gastropod mollusc *Haliotis tuberculata* reaches the northern limit of its distribution in the English Channel Islands. Consequently, the organism is an important component of the region's marine biodiversity. Known locally as the ormer, it is a much prized and extremely valuable seafood. *H. tuberculata* has been culturally significant in the Islands for many centuries and artisanal fisheries have been managed since the late 19th century. Historical records provide evidence of wide variations in ormer abundance due to both climatic influence and exploitation of wild populations. More recently a pathogen has damaged Jersey stocks and a moratorium on gathering was enforced in 1999. Following evidence of stock recovery the fishery was reopened in late 2002 under new regulations.

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Jersey, the largest of the English Channel Islands, situated in the corner of the Golfe Normano-Breton, experiences one of the largest tidal ranges in the world, up to 12 metres over spring tide periods. As a consequence of the Island's varied topography - cliffs on the north coast and gently sloping shores on the south - combined with a constellation of outlying islets, reefs and sand banks, the Bailiwick of Jersey actually doubles in area with each low tide. The expanses of rocky shore found around the Island and on its offshore reefs are of international importance and in 2000 32sqkm of intertidal habitat on the SE Coast (right) have been designated as a Ramsar Wetland of International Importance.

Additionally, the Island's shores experience a wide range of wave exposure, from Atlantic facing west coast storm beaches to a sheltered east coast protected by Normandy's Cotentin Peninsula. The surrounding tidal conditions produce a relatively enclosed anticlockwise tidal circulation enhancing recruitment of many marine species with planktonic early life stages. As the last part of the Channel Island archipelago to be cut off from continental Europe at the end of the last ice age, Jersey's coastal waters are relatively shallow and thus preferentially warm in summer, or cool in winter.

Biogeographically the Channel Islands are extremely important. Marine biodiversity is enhanced given their position on the boundary between the warm Lusitanean ecosystem to the south and the

cool Boreal to the north. Many species are at either the northern or southern limits of their range in the Channel Islands. It has been hypothesised that such limit-of-range populations contain unique alleles or a combination of alleles arisen though genetic adaptation to local, more extreme environmental conditions than core populations. Our habitats and species assemblages are therefore key candidates for survey in several monitoring programmes investigating global climate change.

A large-scale threat to intertidal habitats is land reclamation (above). In 1995 a reef previously identified as one of the most biologically diverse found around Jersey was buried under waste from the Island's burgeoning construction industry. Further threats include nutrient-rich run off entering shallow enclosed embayments and over exploitation of small-scale fisheries.

Unsurprisingly, the intertidal habitats surrounding Jersey have long been important to its human population (below). Low water fishing is a very

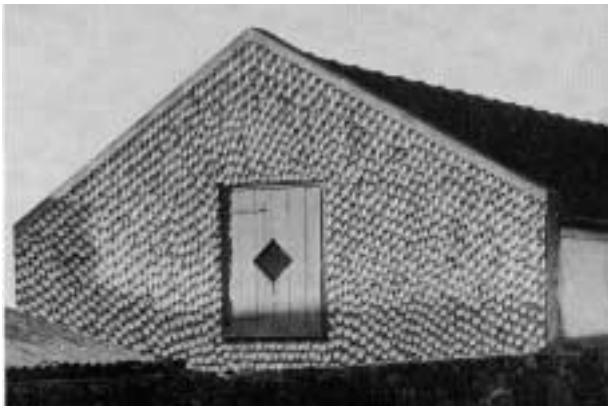
significant aspect of local culture and collecting seafood at low tide is today enthusiastically undertaken by a relatively small but vocal sector of the

community. As one would expect, seafood is an important component in local diets (above).

One particular organism however occupies pride of place in the hearts, minds and appetites of Channel Island low water fishermen (and women) – the ormer *Haliotis tuberculata* (below). While the

Jersey cow or Royal potato and the Guernsey tomato may be well known across the world, to many locals the ormer quietly plays an equal part in Island cultures. Indeed it is difficult to overstate the emotional investment many low water fishermen have in this most highly revered mollusc. Fisheries have existed since prehistoric times, ormer shells have been found in middens near Neolithic passage graves.

The picture below shows a gentleman gathering



ormers at low tide in Jersey during the 1950s. The photograph above illustrates a local dwelling adorned with ormer shells. As well as yielding valuable flesh, ormer shells have long been exported for use as furniture and musical instrument inlays. Here is one of London's celebrated pearly queens with buttons made from Channel Island ormer shells. In 1859 a visitor to the Channel

Islands wrote "*The principal use to which the shell now appears to be put to in the Channel Islands is to frighten away small birds from the standing corn, two or three of them being strung together and suspended from a stick so as to make a clatter when moved by the wind*."

The European ormer (top of next column), the only abalone commercially fished in Europe, reaches the northern limit of its range in the English Channel Islands; in fact Alderney has the most northerly wild population in the world. An extremely valuable seafood, they are highly sought after wherever

they are found, fetching prices of up to £5 per animal. Introduced to Ireland for aquaculture purposes in 1976, further trials currently in progress on the south coast of Britain are yielding encouraging results. Attempts at small-scale culture of ormers in the Channel Islands have so far resulted in only modest success.

Although Channel Island ormer populations are at the northern extreme of the species distribution, it is widely acknowledged that they are most abundant there – testament to the suitability and extent of Channel Island intertidal and sub littoral habitats. Herbivores, successful *H. tuberculata* populations are closely linked to a regular supply of drifting seaweed carried by tidal movements. They are normally discovered clinging to the underside of boulders or in crevices among bedrock, such spots affording a firm foothold allowing for resistance of predators and wave surge. Natural predators include conger eels, octopus, crabs, lobsters and starfish. Mortality in later life can also occur as the shell is weakened by the growth of boring worms or sea sponges. Ormers are almost always found submerged, in pools at mid-shore level down to ten metres below the low water mark. Tagging work has shown that although mobile, ormers move slowly and in one study thirty two per cent of marked ormers did not move over a period of one year. Of those that did move, the average distance travelled was just 6.7 metres.

Either male or female for the duration of its life, an ormer reproduces with peak summer sea temperatures, usually in August or September. Interestingly, evidence suggests that Channel Island ormers spawn in sequence, first around Jersey, followed by more northerly populations in Sark, Herm and Guernsey as sea temperatures increase with the passage of summer. Alderney ormers broadcast their eggs and sperm to the mercy of the ocean currents last. Highly fecund, a fully-grown

ormer (above) may release in excess of six million eggs, which are slightly heavier than water. Approximately twelve hours after fertilisation, hatched ormer larvae swim actively as part of the plankton for four to five days. During this period the early shell develops and the animal gradually sinks to the seabed where, if it settles upon a suitable substrate, it attaches and begins to feed immediately. Settlement is understood to be influenced by physical, chemical or biochemical cues associated with adult ormers, leading to an extremely restricted dispersal of larvae. Rasping with a radula, they feed particularly on a distinctive encrusting pink algae commonly found in rock pools and on submerged rock in shallow water. Mortality among larval ormers at this stage is extremely high due to predation, but also as a result of prevailing weather conditions; with strong offshore winds they are blown away from suitable settlement sites. Conversely, with onshore winds they are driven ashore and favourable recruitment is aided. It is not surprising therefore that it is widely accepted that ormers spawn over slack neap tide periods when the weather is calm, ensuring that as many larvae as possible settle on areas of sea bed providing the best chance of survival.

Growth is slow in the Channel Islands at approximately 15mm per year and most takes place between August and January, with animals reaching a shell length of approximately 45mm in a minimum of three years. Age can be determined from annual growth marks borne by the shell, not unlike the rings found in the trunk of a tree. Animals of both sexes are all mature by 70mm in length. Ormers can reach at least 130mm in length and are known to live up to 15 years.

Historically ormers appear to have been remarkably abundant. Records from the 19th Century suggest that the annual Channel Island take was well in excess of 100 tonnes, with individual gatherers regularly returning with catches of several hundred ormers after each low tide. There have however been dramatic fluctuations in the health of ormer populations in association with prolonged periods of low sea temperature. Major declines in abundance are recorded in the 1890s, 1920s and more recently after a record breaking cold spell in 1963. Temperatures between 8.5 and 9.5°C approximate the long-term (two months plus) lethal limit for *H. tuberculata.*

Given the Channel Island appetite for ormers, it is unsurprising that regulation of the fishery has taken place since 1876. Guernsey were the first to introduce a ban on the sale of ormers below a minimum size limit of 3 inches across the broadest part of the shell combined with a closed season from the beginning of May to the end of August each year. Jersey followed suit shortly after, but evidently over-fishing combined with the earlier mentioned climatic influence on the health of ormer populations was perceived as a major threat to the continued survival of the animal on our shores. Writing from the Jersey Marine Biology Station in 1897 in his plea for reform of the Island's fishing laws James Hornell wrote of "our dead ormer fisheries". It seems the decline of ormer populations continued, and in 1899 both Jersey and Guernsey authorities further strengthened fisheries regulations: altering them to control not simply the sale of ormers, but their shoreline harvest and further extending the closed season.

Things appear to have settled down again with the advent of the 20th Century and the next significant episode in the history of Channel Island ormer fisheries take place in 1924 when the results of field surveys commissioned by the States of Guernsey prompted both Islands to close their fisheries for a period of two years.

From then until the early 1960s *H. tuberculata* populations and ormer fishermen appear to have fared quite well with no significant events recorded. The exceptionally cold winter of 1963 however was a major threat to the continued existence of ormers in the British Isles. Anecdotal records reveal that moribund and rotting dead ormers were found in great numbers around all of the Channel Islands and it was to take two decades for stocks to recover to anywhere near their previous levels.

Before this could happen though another major threat to the health of *H. tuberculata* stocks had to be dealt with. The advent of SCUBA technology

meant that previously inaccessible ormers were now open to exploitation and a complete ban on harvesting using any form of breathing apparatus was promptly introduced in both the Bailiwicks of Jersey and Guernsey. Although diver harvesting was permitted in a small area of the South Coast of Guernsey until the end of 1973, when a further two-year moratorium on ormer fishing by any method was declared across the entire Channel Island archipelago. After the fishery was reopened in 1976, the 3-inch minimum size was increased and amended to 80mm and for a short time regulations were harmonious throughout the Channel Islands. However, subsequent adjustments to closed seasons meant that ormer harvest regimes soon varied at least a little from bailiwick to bailiwick - Jersey and Guernsey having of course long celebrated their differences.

The next significant change in regulation did not come about until 1995 when things moved on dramatically and both Bailiwick authorities passed legislation controlling the possession of fresh ormers rather than their harvest or sale. It is fair to say that this change came about largely due to the difficulties experienced in enforcing the earlier regulations, combined with a welcome increase in abundance of ormers around Channel Island coasts and a consequent growth in fishing activity. A series of relatively mild winters and exceptionally warm sea temperatures in 1989 and 1990 apparently providing a boost to numbers. After more than two decades of relatively poor catches, low water fishermen were once again returning with reasonably full baskets. While the ormer bonanza of the previous century was long past, in the mid-nineties twenty to thirty ormers per fishable tide was considered a fair catch by most gatherers.

Then, sadly in the summer of 1999 another period of significant mortality was reported among sub littoral ormer populations in Jersey. This was not entirely unexpected because the same phenomena had been recorded among French populations. Mortality had been observed to move progressively north from Biscay in 1996, rounding Cap Finisterre in 1997 and reaching the North Coast of Brittany in 1998. Early dive surveys suggested that as many as 66% of ormers had been killed off by a mystery pathogen. Wisely, the States of Jersey decided to close the fishery to protect all remaining healthy ormers from exploitation. Only those molluscs living below the low water mark appeared to suffer the ill effects of a pathogen subsequently identified as a relative of *Vibrio carchariae*, known to have historically affected Japanese abalone. Interestingly, the disease does not appear to have spread to the other Channel Islands. This is perhaps because the waters north of Jersey tend to be deeper, thus cooler and the *V. carchariae* sp. in question does not appear to function at sea temperatures below 18°C. Hence, climatic processes were potentially influencing the health of Channel Island ormer populations once again, albeit this time indirectly.

Somewhat perversely this unfortunate episode has actually had its advantages, further focusing public attention on this valuable component of Jersey culture and biodiversity. The ban on fishing was almost universally supported and afforded the Island's authorities a welcome opportunity to further improve the ormer's conservation. When the fishery was reopened in Autumn 2003 (right), the closed season was lengthened by one month to afford any late spawners further protection and the minimum legal size was simultaneously increased to 90mm (below). Size limits in

Guernsey and France remain at 80mm. Additionally; the absence of ormers from Jersey diets has dramatically improved the appetite among locals for information about their ecology and appropriate management. For example, as a result of publicity and tactful explanation, low water fishermen are now more willing to make the effort to return boulders to their original position when hunting ormers, thus avoiding negative and un-necessary habitat disturbance (above). Education naturally plays an important role in ensuring sustainable ormer fisheries continue to be a valuable feature of local life and much effort is expended trying to improve understanding within local and immigrant communities in Jersey (below).

- Harvesting may take place in season on the first day of each new or full moon and the three following days (Two following days in Guernsey)
- Possession of fresh ormers is permitted on the first day of each new or full moon and the three following days onboard a vessel, or five days on dry land
- No person is permitted to export an ormer that is not a fresh ormer
- Frozen ormers may be possessed at any time in Jersey (it is illegal to freeze ormers in Guernsey)

To summarise, the regulations controlling Channel Island ormer fisheries have evolved with great community involvement and interest over the past 125 years or so. No conventional management plan exists per se, but, driven almost equally by ecological necessity and perceived community requirements, current conservation regulations in Jersey are as follows:

- Minimum size - 90mm (80mm in the Bailiwick of Guernsey and France)
- No bag limit in either Jersey or Guernsey (A limit of 20 ormers per day per fisherman exists in France)
- Harvesting may take place from 1 October to 30 April (From 1 January to 30 April in Guernsey)

Introduction to the forthcoming review of potential new Wetlands of International Importance (under the Ramsar Convention) in the UK and the UK Overseas Territories

Mike Pienkowski, UK Overseas Territories Conservation Forum and David Stroud, Joint Nature Conservation Committee

Pienkowski, M. & Stroud, D. 2003. Introduction to the forthcoming review of potential new Wetlands of International Importance (under the Ramsar Convention) in the UK and the UK Overseas Territories. pp 190-194 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The Ramsar Convention has proven very useful in many aspects of taking forward conservation. One major component of this concerns conservation of sites. UK Government is committed to a review of what further sites should be designated and the needs of designated sites, both in UK and the UK Overseas Territories. The plans for this work, by JNCC in the UK and coordinated by the Forum in the UKOTs, is outlined.

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Introduction: Eighth Conference of the Parties to the Convention

For several reasons, it is timely to review the relationship of the Ramsar Convention on Wetlands in relation to the UK Overseas Territories. This Convention is proving useful in many respects in the UKOTs, and has guidelines and other resources which may be of further use. In the last few years, often following facilitation by the Forum, those UKOTs and Crown Dependencies not previously included in UK's ratification of the Convention have opted to join (except British Antarctic Territory, which is covered by the Antarctic Treaty). With technical help from the Forum and JNCC, several sites have been designated in the UKOTs and a Crown Dependency, and others are under consideration.

The Eighth Conference of the Parties (i.e. the nations which have joined, with NGOs – including the Forum – and other bodies as observers) met in Valencia, Spain, in November 2002. This was attended by 119 countries. There was a significant focus on problems of small island states and overseas territories, including a specific Resolution concerned with Pacific islands. There was also a major emphasis on implementation of the strategic framework for site selection.

Other key decisions at Ramsar CoP8 were:

- The problems of invasive and non-native species, especially on islands. This is one of the primary threats to global biodiversity. The CoP adopted and encouraged application of guidance previously adopted by the Convention on Biological Diversity and other multilateral environmental agreements.
- The adoption of revised Management Planning guidance
- New site selection guidance for peatlands, coral reefs, wet grasslands, temporary pools and mangroves. Amongst many other important features, these also recommend the extension of coral reef Ramsar sites into deep water sufficient to include the surrounding reef structure which is essential to the maintenance of the system.
- Guidance on water resources management
- Communication, Education and Public Awareness – the adoption of a strategy for 2002-2005

- The adoption of guiding principles for including cultural issues in Ramsar site management

More strategic approaches to identifying national networks of Ramsar sites

The Convention's "Vision for the List" is:
"To develop and maintain an international network of wetlands which are important for the conservation of global biodiversity and for sustaining human life through the ecological and hydrological functions they perform"

This international network is to be:
"built from coherent and comprehensive networks of Ramsar sites established within the territory of each Contracting Party"

In order to move towards a fully coherent and comprehensive site network, the CoP recommended the following national approach:

- a national wetland inventory – this gives a basis for the choice of sites
- at least identification of potential Ramsar sites (a directory of important wetlands)
- a strategy and priorities for future designations (very few countries appear to have these, and most designations continue to be made on a seemingly *ad hoc* basis)

CoP8 Resolution 10 calls on Contracting Parties to:

- Renew their efforts to apply the Strategic Framework
- Establish (as a priority) a strategy and priorities for further designations, and report on progress by December 2003
- Establish national designation targets (number and area of sites), within a global target of a further 250 sites and 55 million hectares by CoP9 in 2005.

The UK Ramsar network

UK has 158 Ramsar sites, which is an impressive total in global terms. These include 144 in Great Britain & Northern Ireland – but only patchy coverage in UK Overseas Territories and Crown Dependencies, where application of the Convention effectively started much later than in Great Britain & Northern Ireland.

Some problems remain in the list within GB & NI. In particular:

- some important wetland types and sites are not included
- the network has a bird bias, and citations (and thus conservation objectives) on some GB & NI sites focus on birds to exclusion of habitat interests (or other wetland species).

The UK has made a commitment in its UK National Report to CoP8 to review its national series. UK Government (in conjunction with the National Ramsar Committee, which brings together officials and NGOs, including both the Forum and JNCC) aim to complete review to report to CoP9 (November 2005). UK intends to complete this in parallel with a six-yearly update of Ramsar Information Sheets (RISs), which is also due for UK.

Priorities have been established for this review. A high priority is placed on:

- designation of wetland types and wetland species unique or endemic to Contracting Party, or
- where a country holds high proportion of global extent/population
- selection of wetland types under-represented in global Ramsar list (including peatlands, wet grasslands, sea-grass beds, mangroves and coral reefs).

UK Overseas Territories review

The UKOTs are generally small in both area and human population to share the cost of conservation work. However, they support biodiversity of much greater global significance than UK territory falling within the larger Great Britain and Northern Ireland. UKOT wetlands are of global significance for:

- Endemic species and races
- Coral reefs
- Mangroves
- Sea-grass beds.

Therefore, there is the opportunity to make major contribution here.

For the last few years, the Forum has been discussing the ways to facilitate progression on this, with JNCC and the Department of the Environment, Food & Rural Affairs (Defra, which with its predecessors provides the UK Government's lead

department on Ramsar). JNCC is co-ordinating a review of Ramsar sites in Great Britain and Northern Ireland. Defra has published its intention to contract the Forum to undertake the complementary review in UKOTs, but this contract has not yet been placed. Nevertheless, it would be negligent to miss the opportunity to consult UKOTs (and Crown Dependencies) at this Conference.

Accordingly, the following material is an initial summary review of the present position. Anyone with corrections or additional material is requested to contact pienkowski@cix.co.uk. (Defra has since indicated that it has discovered that its internal procedures do not now allow it to place the contract it announced without a tender process, which is now underway. Therefore active work on this review has had to be suspended. However, the review will have to take place in some form and be completed in 2004; therefore, information is still welcome.)

Territory	Ramsar sites designated	Ramsar sites in progress	Other Ramsar sites proposed	List of identified sites known to need updating
Anguilla	0		5	Y
Bermuda	7		4	Y
British Virgin Islands	1		2	Y
Cayman Islands	1		2	Y
Montserrat	0		0	Y
Turks and Caicos Islands	1		0	Y
Ascension	0		0	Y
British Antarctic Territory	0		0	
Falkland Islands	2	2	1	
St Helena	0		0	Y
South Georgia and the South Sandwich Islands	0		0	Y
Tristan da Cunha	0		0	Y
British Indian Ocean Territory	1		1	
Pitcairn Islands	0		3	
Cyprus Sovereign Base Areas	0	1		
Gibraltar	0		1	
Bailiwick of Guernsey	0	1		Y
Bailiwick of Jersey	1		1	Y
Isle of Man	0			Y

The first Table lists the totals of Ramsar sites which have been designated to date in the UKOTs and the Crown Dependencies, together with the number of sites known to be in progress to designation. (Since the Bermuda Conference, the site in the Cyprus Sovereign Base Area has been designated.)

This Table indicates also the totals of other Ramsar sites proposed. However, this list of proposed sites is now many years old and, in some cases, based on survey information from the 1980s or earlier. Whilst a great deal of survey is still needed in most Territories on many taxa, much has been done in recent years. This is one reason for the review. The final column of the Table indicates those Territories for which it is known that the list of proposed sites needs updating, but this comment may apply also to some of the others.

An important aspect of the review will be the need to assess coverage of the global priority ecosystyems across the geographical spread of the UKOTs and Crown Dependencies, as well as coverage of endemic and other important populations of plants and animals.

The second Table (on the next page) is a first summary of the occurrence of these features in each of the UKOTs and Crown Dependencies. The

Table indicates also those features which are included to some extent in an already designated site. This does not necessarily indicate that coverage is adequate for that aspect in the Territory concerned.

It is anticipated that all these aspects will be investigated further in the full review, and information is welcome.

CoP8 Resolution 10 calls on Contracting Parties to:

- Collaborate in designating international networks for migratory species
- Update and improve information on the many (almost 50%) designated Ramsar sites for which this is missing – using the revised Information Sheet on Ramsar Wetlands (CoP8 Resolution 13).

The third Table (at bottom of page) lists already designated sites in the UKOTs and Crown Dependencies, with their areas and dates of designation. Also indicated is whether their Ramsar Information Sheets are known to have been updated or need updating and/or further information.

Territory **P** = present in Territory **D** = included to some extent in a site	Coral reefs	Man-groves	Sea-grass beds	Wet grass-lands	Peat-lands	Unique wetland types and endemic species
WIDER CARIBBEAN						
Anguilla	**P**	**P**	**P**			**P**
Bermuda	**P**	**PD**	**P**			**PD**
British Virgin Islands	**P**	**P**	**P**			**PD**
Cayman Islands						**PD**
Montserrat						**P**
Turks and Caicos Islands	**PD**	**PD**	**PD**			**PD**
SOUTH ATLANTIC						
Ascension						**P**
British Antarctic Territory						**P**
Falkland Islands				**PD**	**P**	**PD**
St Helena						**P**
South Georgia and the South Sandwich Islands				**P**	**P**	**P**
Tristan da Cunha				**P**	**P**	**P**
INDIAN OCEAN						
British Indian Ocean Territory	**PD**	**P**	**P**			**P**
PACIFIC						
Pitcairn Islands	**P**					**P**
EUROPE						
Cyprus Sovereign Base Areas						
Gibraltar						
Bailiwick of Guernsey				**P**		
Bailiwick of Jersey				**P**		
Isle of Man				**P**		

Name	**Territory**	**Area (ha)**	**Date designated**	**Updated RIS**
North, Middle and East Caicos Islands	Turks & Caicos	58617.00	27/06/1990	2002
Booby Pond and Rookery	Cayman Islands	82.00	21/09/1994	needed
Warwick Pond	Bermuda	2.30	10/05/1999	needed
Somerset Long Bay Pond	Bermuda	1.10	10/05/1999	needed
Hungry Bay Mangrove Swamp	Bermuda	2.01	10/05/1999	needed
Pembroke Marsh East	Bermuda	7.82	10/05/1999	needed
Paget Marsh	Bermuda	11.35	10/05/1999	needed
Lover`s Lake Nature Reserve	Bermuda	2.10	10/05/1999	needed
Spittal Pond	Bermuda	9.53	10/05/1999	needed
Western Salt Ponds of Anegada	British Virgin Islands	1071.00	10/05/1999	needed
South East Coast of Jersey, Channel Islands	Jersey	3210.50	25/09/2000	
Diego Garcia	British Indian Ocean Territory	35424.05	28/02/2001	
Sea Lion Island	Falkland Islands	1000.00	24/09/2001	
Bertha's Beach	Falkland Islands	4000.00	24/09/2001	

NAME	COUNTRY	AREA (HA)	MANAGEMENT
North, Middle & East Caicos Is	**Turks & Caicos**	**58617.00**	**Plan in place /work starting – see this session**
Booby Pond and Rookery	**Cayman Islands**	**82.00**	**Management in place**
Warwick Pond	**Bermuda**	**2.30**	See next session!
Somerset Long Bay Pond	**Bermuda**	**1.10**	
Hungry Bay Mangrove Swamp	**Bermuda**	**2.01**	
Pembroke Marsh East	**Bermuda**	**7.82**	
Paget Marsh	**Bermuda**	**11.35**	
Lover`s Lake Nature Reserve	**Bermuda**	**2.10**	
Spittal Pond	**Bermuda**	**9.53**	
Western Salt Ponds of Anegada	**British Virgin Islands**	**1071.00**	**Management being developed**
South East Coast of Jersey	**Jersey**	**3210.50**	
Diego Garcia	**Br Indian Ocean Terr**	**35424.05**	
Sea Lion Island	**Falkland Islands**	**1000.00**	
Bertha's Beach	**Falkland Islands**	**4000.00**	

CoP8 Resolution 10 calls on Contracting Parties to:

- Treat designation only as a start, and to
- Establish management planning and monitoring at all sites, and
- Fully report changes in ecological character (Article 3.2)
- Recognise the importance of a full Ramsar site network for maintaining wetland values and functions so as to combat poverty.

The fourth Table (above) indicates the known state of management planning for the Ramsar Wetlands of International Importance which have been designated to date. Once again, this information is a first summary and is likely to be incomplete. Additional information would be welcome.

The presentation from Turks & Caicos National Trust, the Forum and CABI in this session address one site, and management is in place too at the site in the Cayman Islands. Management is being developed at the BVI site, and a plan is being developed for the new site in the Cyprus Sovereign Base Areas.

Some of the Bermuda Ramsar sites and other wetlands in Bermuda provide the venues and subjects of the field workshops in this session. Consideration of Ramsar status, information and management form part of these exercises.

Introduction to field workshops on management planning

David Stroud, Joint Nature Conservation Committee

Stroud, D. 2003. Introduction to field workshops on management planning. pp 195-199 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The afternoon's workshops on management planning are outlined. This involves putting in context as well as logistical information. The background material draws on the Ramsar Convention's new guidelines on management planning, as well as other sources.

David Stroud, Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough PE1 1JY, UK. david.stroud@jncc.gov.uk

Workshop objectives

The objectives of the Conference's Management Planning Workshop were as follows:

1. To update Conference participant's management planning skills through a practical exercise.

2. To assist in developing thinking about management needs of the species at the sites visited. Participants may have faced similar management issues in other territories and information exchange may bring useful insights into practical conservation problems in Bermuda.

3. The UK has to update Information Sheets on all its Ramsar sheets in the course of the next year for submission to the ninth Conference of Parties to the Convention in 2005. The workshop provides a useful opportunity to collect descriptive information on those areas to be visited which are designated Ramsar sites.

4. To allow conference participants to experience some of Bermuda's important natural habitats and understand the range of local conservation issues and management problems.

Management planning

Management planning is an essential activity to ensure that the management of sites, whether for nature conservation or other heritage values, is undertaken within a logical and coherent framework. This is essential to ensure consistency of approach between individual managers and across years, and so ensure that management is directed to greatest effect.

In recent years there has been considerable development of the format of site management plans. One widely accepted format is that adopted by the Ramsar Convention. This closely links to formats derived independently in France and the UK in the 1980s (*e.g.* Nature Conservancy Council 1987).

The Ramsar Convention initially adopted management planning guidance in 1993 (following an international workshop in North Wales in 1992). In the light of international experience with its application, this guidance has been recently revised and updated. It was adopted by Ramsar's eighth Conference of the Parties in November 2002. The *New Guidelines for management planning for Ramsar sites and other wetlands* can be found on the Ramsar web-site at: www.Ramsar.org/key_res_viii_14_e.pdf.

Despite its title, the Ramsar guidance is also applicable to non-wetland sites.

Much of the following outline is based on this guidance, and considerable further detail and background is given in the Ramsar guidance.

Five Essential Steps

Any Management Plan has five essential steps:

a) Preamble/policy (Why are we doing this?)
b) Description (What do we know?)
c) Evaluation (Why is the site important?)
d) Objectives (What do we want to do?)
e) Action Plan (How are we going to do it?)

Preamble and policy statement
The preamble is a concise policy statement that should reflect, in broad terms, the policies and/or practices of those organisation(s) concerned with the production and implementation of the management plan. It should emphasise how this might effect the implementation of the plan.

For example, the scope and nature of a management plan produced by a governmental body, with statutory or regulatory powers, will be different in nature and scope to a plan produced by a non-governmental organisation with different obligations and powers.

Description
The Description provides the essential background information about a site and its features of importance. This data and information are used to drive the rest of the site management planning process. It provides a collation and synthesis of all the relevant existing data and information for the site, and in terms of management it should provide a 'one-stop shop' for management-related information.

This part of a Management Plan should be regularly reviewed and updated, so as to incorporate new sources of data and information, including updates from monitoring activities. This feedback is essential, since aspects of the site's ecology will change in response to management. This information needs to be captured so as to be able to assess and review the efficacy of management.

Evaluation
The Evaluation process identifies or confirms the important features or foci for management planning. It addresses the question as to why the site is important and exactly for what (in terms of species or habitats) are we seeking to plan. Clarity of approach at this stage is essential.

Evaluation of important features is undertaken separately for different interests, including:

- ecological character features
- socio-economic features
- cultural features
- and any other important features identified

A range of familiar criteria are used to help evaluate ecological character features. These include:

- Size
- Biological diversity
- Naturalness
- Rarity
- Fragility
- Typicalness
- Potential for improvement and/or restoration

Other criteria may be used to evaluate other features of importance on a site (such as aspects of cultural importance).

An outline from Ramsar's guidance (top of next page) illustrates the separate evaluation of different types of feature on a site and how these logically link to objective setting.

Objective setting
Through undertaking the Evaluation, a list of the important site features will have been identified. The next step is to prepare management objectives for each of these features.

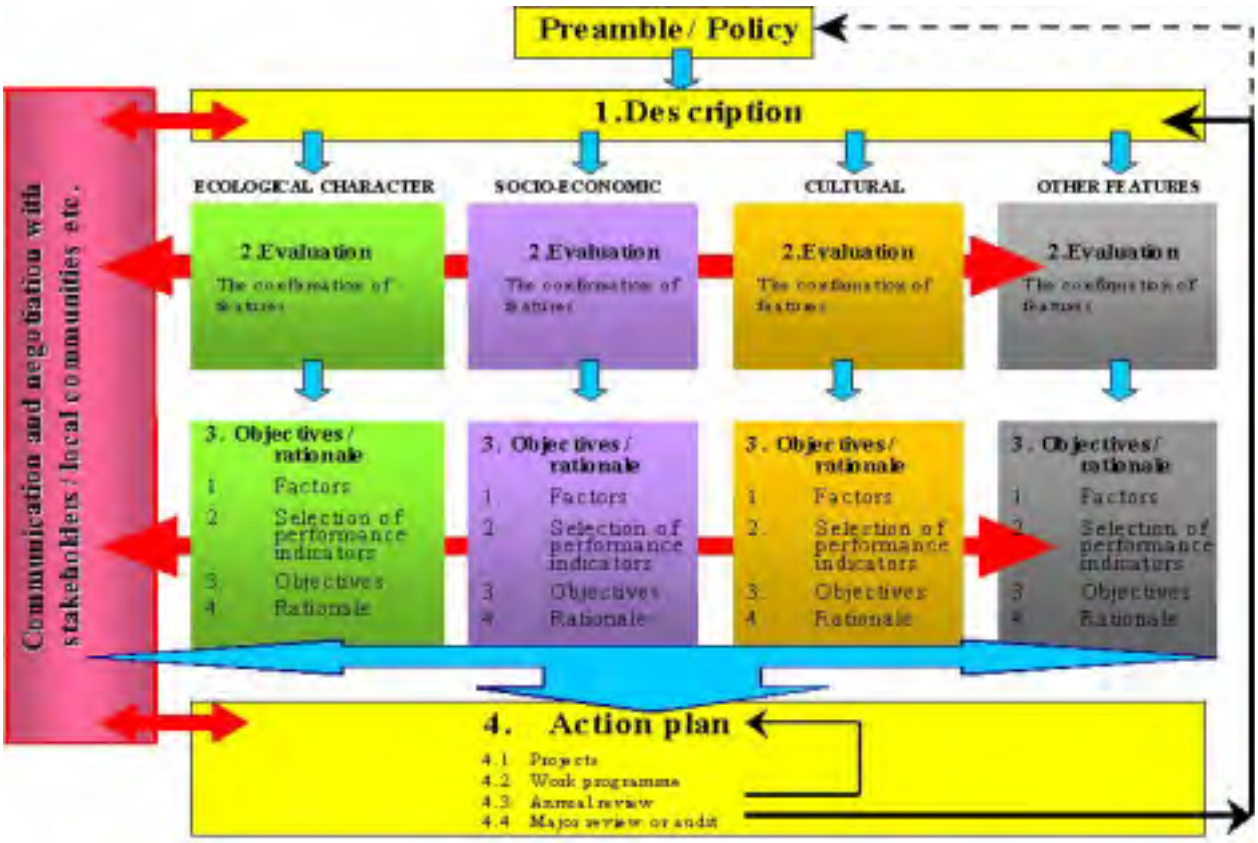
An Objective is an expression of something that should be achieved through management of the site. Objectives should have the following characteristics:

1. ***Objectives must be quantified and measurable:***
   - this is because if they are not measurable, it is impossible to assess through monitoring whether they are actually being achieved.

2. ***Objectives should be achievable, at least in the long term:***
   - because there is little purpose in pursuing objectives that are inherently unattainable!

3. ***Objectives must not be prescriptive: they define the condition required of a feature and not the actions or processes necessary to obtain or maintain that condition:***
   - because Objectives are an expression of purpose;
   - and there is a need to differentiate between the purpose of management and the management process itself. Thus, for example, in restoring a site with damaged ecology, a range of quite different actions may be necessary progressively at different stages of the restoration process.

There are three key stages in the process of preparing measurable objectives for a site:



i) Describe the *condition* (*i.e.* the end-point) that is required for a feature.

ii) Identify the f*actors* that influence the feature, and consider how the feature may change as a consequence.

iii) Identify and quantify a number of *performance indicators* for monitoring progress in achieving the objectives for that feature.

Projects

The objectives of a Management Plan will be delivered through a number of projects. Each of these should specify the following:

When:	when will work be carried out and for how long?
Where:	where will activities take place on the site?
Who:	who will do the work and how much time will be required?
Priority:	what priority is given to the project?
Expenditure:	how much the work will cost?

Management planning on Bermuda

Most of the six sites visited during the workshops are small. Thus there is a particular need to consider the importance of external influences on ecological processes within these protected areas. The following issues are particularly important:

- to what extent are the sites influenced by off-site factors?
- what are these?
- and how might these be controlled?

The essential point is that to adequately conserve most protected areas, management planning should not stop at the site boundary. Usually much larger frames of reference will be needed, including catchment management planning or (in mainland contexts) river-basin planning.

The participants on the workshops were asked to consider a range of factors that were probably affecting the sites to be visited, and a number of questions were posed:

1. ***The impact of non-native or invasive species on the features of importance (species and habitats)***

   - *e.g.* feral cats and their impacts on nesting bird populations
   - Non-native plants
   - What are the impacts of these non-natives on features of importance?
   - How might these impacts be controlled?

(Even if it is not feasible to eliminate impacts, is it possible/desirable to reduce impacts?)

2. ***What is the role of local communities in management of sites?***

   There is a very high population density in Bermuda, and most protected areas are small. Thus what is the role of surrounding local communities and how does that create either problems or opportunities? In particular, what are the opportunities and needs for education and public awareness at each of the sites.

Guidance to leaders and rapporteurs

The following notes (also including the Workshop Objectives noted above) were supplied to the leaders and rapporteurs for each group, and these were supplemented by briefings.

The following sites will be visited, with a note on habitats and conservation issues:
Hungry Bay (Ramsar site, Nature Reserve): Bermuda's largest mangrove swamp threatened by erosion consequent on human impacts and rising sea-levels

Pembroke Marsh East (Ramsar site, Nature Reserve): Freshwater *Typha* marsh. Pollution from adjacent garbage dump and urban development

Devonshire Marshes (not designated): Peat swamp basin. Integration of management with surrounding areas

Spittal Pond (Ramsar site, Nature Reserve)

Cooper's Island (Partly Nature Reserve): Relatively unmodified coastal habitats: potential to significantly expand reserve and create major ecotourism attraction. People management issues.

Coney Island (National Park): Marine pond with mangroves; rocky shoreline dominated by native plants; seagrass beds. Degraded coastal hillsides with dense stands of *Casuarina.* Need to relocate the scrambling track; restore water exchange; eliminate invasive plants.

Leaders
Leaders will play an important role in facilitating the exploration and discussion of the issues concerned. It is suggested that initially leaders identify expertise within the group. There is no fixed format for field activities. One option may be to work as a single group, alternatively there may be value in splitting into two or more separate groups to consider different issues - especially if there are people with complimentary skills in the group.

Given the reliance on local helpers to provide information on the sites and issues, there may be merit at least at first, in working in a single group until participants are broadly familiar with the site and conservation/land management issues to be addressed.

We can expect local helpers to give participants a briefing on issues at each site, although it may be helpful to make contact with 'your' local helper in advance of the field trip for a personal update on the relevant issues.

A minimum desired product from each group will be:

- A list of the features of conservation importance at each site; and
- Measurable conservation or other management objectives for each of these features (note these objectives should not necessarily be related exclusively to nature conservation, if there are heritage or other cultural values present).

At least some management recommendations at each site would be desirable.

Rapporteurs
The role of the rapporteurs will be to assist Leaders to capture the conclusions of the group in a fairly systematic manner (you will have forms for completion in the field which will assist in this).

These forms will be compiled to produce a number of outputs from the workshop including feedback to the Conference.

Please return forms to David Stroud at the conclusion of the field trips.

Local experts
The role of the local experts will be to brief the field groups on the main features of importance at each of the sites, the background to past conservation action there, and current issues.

It would be useful to provide information to the group not only about conservation actions that have been successful, but also those that have been less so. This might provide valuable areas for discussion and consideration (learning from past mistakes).

Notes for participants

Conference participants were supplied with a set of outlines on the six sites edited from the Background site descriptions reproduced in the following site sections. This was preceded by the following introductory note:

"On Tuesday afternoon, the conference will divide into small, manageable groups, each to visit one of Bermuda's interesting sites to make a structured effort at developing a plan for aspects of management. This further develops an initiative which proved very popular at the Gibraltar meeting. Lists will be placed on the Reception desk so that participants can indicate a preference as to which field workshop they would prefer. Please note that, whilst the organizers will do their best to accommodate these preferences, this will not be possible if too many sign up for any. You are advised to indicate your choice early to give the best chance of its being met.

"This document summarizes the six options to help you indicate a preference. Participants in each workshop will receive some fuller notes for 'their' site."

Once the groups were created, each participant received the full background site description and aerial photograph for 'their' site.

Field workshop reports

In the following pages, a report is given on each site visited. At the start of each report are the notes provided to the participants , including the aerial photograph (the latter are Copyright of Bermuda Government Ministry of Works and Engineering). Following this, is the report from the field workshop. Where possible, the text is illustrated with photographs supplied by members of the workshop team or others.

Acknowledgements

There was considerable positive feedback from participants following the field workshops. Thanks to all for their many and varied inputs which helped make it such a collectively successful exercise.

Particular thanks go to Annie Glasspool, Andrew Dobson, Jack Ward, Joseph Furbert and David Wingate for the provision of initial background material, to Mike Pienkowski for suggestions and help, and especially to all the leaders, rapporteurs and local experts for their crucial role in synthesising conclusions, summarising these over-night and presenting them to the following morning's session): Michael Brooke, Liz Charter, Colin Clubbe, Andrew Dobson, Alison Duncan, Vin Fleming, Joseph Furbert, Annie Glasspool, Brendan Godley, Madeleine Groves, Julie Marshall, Drew Pettit, Peter Ryan, Sarah Sanders, Joseph Smith-Abbot, Andrew Syvret, Jack Ward and David Wingate.

David Stroud and Mike Pienkowski are particularly grateful to Judie Clee for logistic support to the organisers, and guiding us in style around several of the sites.

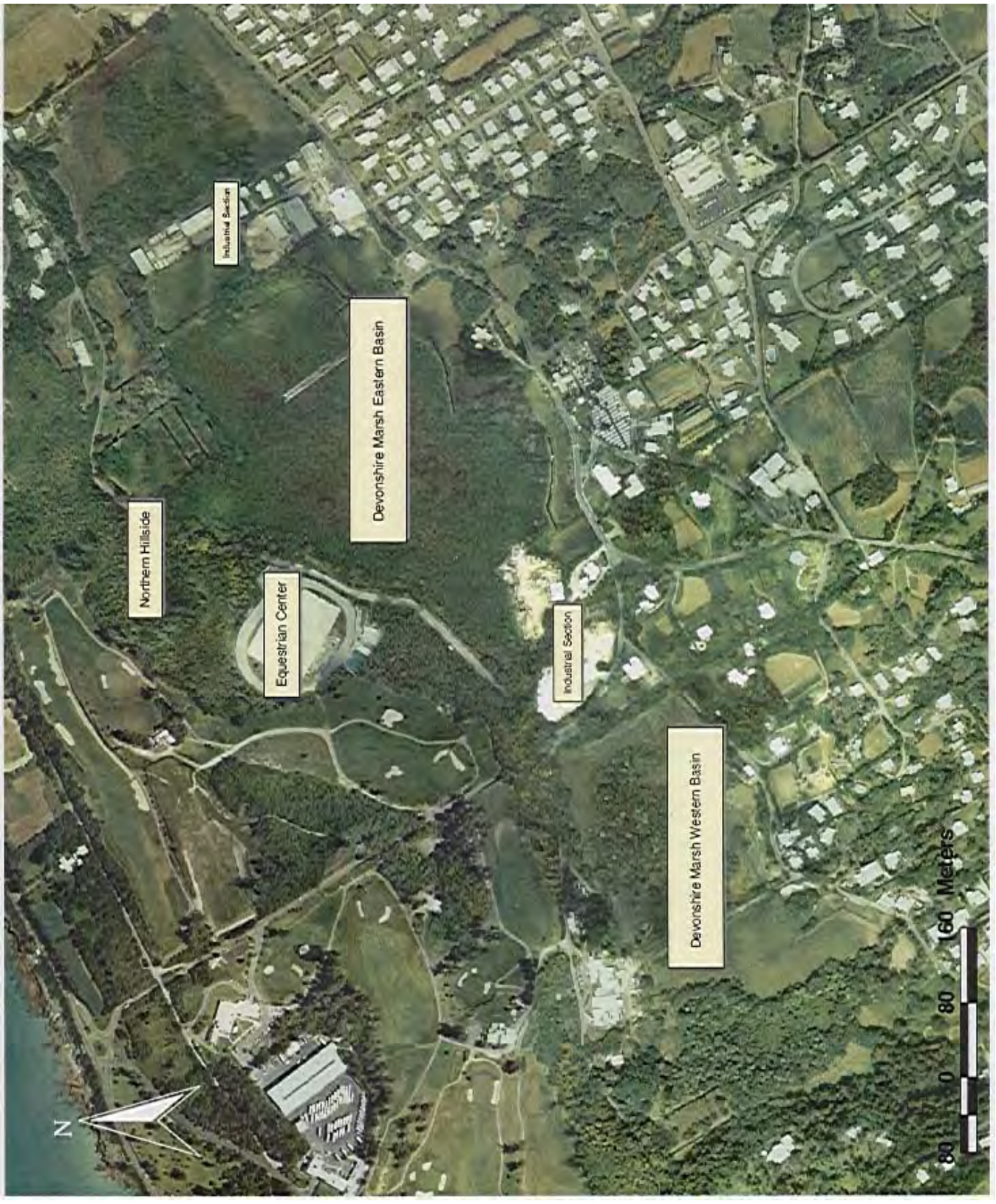
Reference

Nature Conservancy Council 1987. *Site management plans for nature conservation: a working guide*. NCC, Peterborough. 40 pp.

Devonshire Marshes

Leader: Liz Charter; rapporteur: Vin Fleming; local expert: David Wingate

Charter, E., Fleming, V., Wingate, D. & Stroud, D. 2003. Devonshire Marshes. pp 200-211 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org



Background site description

Status - Possible Ramsar site

Ramsar criteria - not yet analysed

Size - 30.14 ha (eastern section 19.6 ha, western section 10.54 ha)

Principle biotopes
Two large peat marsh basins consisting mainly of sawgrass swamp, bracken savannah, wet pasture and a section of swamp forest.

Description and ecological features
(Information from UKDT Ramsar review information sheet 1992, & David Wingate)
Two large peat marsh basins consisting mainly of extensive sawgrass swamp, fire-climax bracken savanna, wet pasture and, in the western section, swamp forest. Peat depth reaches 12 m. The two basins are separated by a narrow strip of dry ground with a highway, and lack open water except in mosquito control ditches. The marshes are periodically flooded by heavy rains and the water is almost fresh (4 ppt salinity).

Devonshire Marsh vegetetation (EC)

The site is the largest peat marsh basin in Bermuda (and largest tract of open land left in the islands) and one that has never been used for the dumping of rubbish. Freshwater is extracted from filtration galleries around the marsh edge for domestic use.

The western basin has the only continuing wet pasturing on Bermuda, whilst the eastern basin is primarily used for fodder cutting.

Noteworthy flora
Extensive stands of sawgrass *Cladium jamaicensis*, bracken fern *Pteridium caudatum* and *Osmunda* ferns with scattered *Myrica cerifera*. *Ilex vomitoria* and small paches of endemic Bermuda cedar *Juniperus bermudiana* and the rare endemic Bermuda palmetto *Sabal bemudana* swamp forest including the naturalised palm *Phoenix reclinata*. Marsh edge pastures are dominated by *Paspalum urvillei* and *Panicum purparescens*.

West Marsh pasture (BP)

East Marsh (BP)

Noteworthy fauna
An important area for some passage and wintering waterbirds, notably American Bittern *Botaurus lentiginosus*, Cattle Egret *Bubulcus ibis*, Green Heron *Butorides virescens*, Little Blue Heron *Egretta caerulea*, Glossy Ibis *Plegadis falcinellus*, Sora Rail *Porzana carolina* and Common Snipe *Gallinago gallinago*.

Several introduced species occur in the marsh including the Orange-cheeked Waxbill *Estrilda melpoda*, the toad *Bufo marinus* and the frogs *Eleutherodactylus johnstonei* and *E. gossei.*

Social and cultural values
Aesthetic

Site vulnerability and management statement
Fires. The site was originally cedar dominated but these were destroyed in the great fire of 1914. Use of the marsh for grazing and celery cultivation during the early part of the twentieth century

Devonshire Marsh ferns (EC)

initiated habitat changes that have made the site progressively more vulnerable to fires. The marsh has now changed to an open savannah habitat dominated by fire-climax species such as sawgrass and bracken fern, which not only survive fires but produce much litter. Subsequent fires in the 1940s, 1950s, 1970s, and in 1996 have prevented the marsh from becoming reforested.

A suggested option might be to create water barriers which would serve as fire breaks, thereby reducing management needed. This could increase habitat diversity (a desirable objective?) and produce soil and peat for sale.

There is conflicting use of land with an industrial site in the middle of the site.

"One of the overall visions for this area is to integrate the northern hillside into the existing nature reserve by closing the access road, grassing it in and making it a walking trail. By taking out the road and joining the two parks, the largest contiguous open area in Bermuda would be created, which would be adjacent to a large golf course. This area is very importance aesthetically and ecologically."

Team discuss the road (EC)

Current scientific research/survey/monitoring and facilities
Not known

Current conservation education
Not known

Current recreation and tourism
Not known

Possible management issues to explore on site:

What off-site factors influence the management of the site? How might these be addressed? How to integrate the management of the site with that of the surrounding area?

How to reduce and manage fire risk? Creation of fire breaks? Issues?

Illegal dumping at Devonshire Marsh (EC)

Industrial encroachment and proposed expansion of equestrian centre (but development is, to an extent, constrained by lack of solid foundations requiring deep piling)

Disturbance?

Overgrazing

Any invasive species issues and their management?

Monitoring needs?

Cat feeding station (BP)

Some of the Field Workshop team plan their work (BP)

Report of Field Workshop

Group members:
Liz Charter (leader)
Iain Orr
Bruce Potter
David Wingate (local expert)
Steve Conway (local expert)
Jim Sinclair and colleague (local experts)
Vin Fleming (rapporteur).

Summary

The group were impressed with the quality of this site which consists of two peatland basins (bisected by a road and current industrial uses) and adjoining areas of (non-native) woodland. Together with an adjacent golf course, they form the largest area of open ground remaining on the islands. The wetlands consist of predominantly native vegetation, support some rare and scarce plants and are important for passage and wintering birds. The group felt that the site met criterion 1 of the Ramsar Convention, namely that it contains *a representative and rare example of a natural or near-natural wetland type found within the appropriate biogeographic region*. It should thus be considered as a candidate wetland of international importance.

From, a quick evaluation of features, it was clear that the site scored very highly for features such as size, naturalness, biological diversity, rarity (of habitat), typicalness and potential for education, public awareness and research, especially in light of its central location and ready access.

Nevertheless, there are a number of problems that affect the site including those of alien species, industrial encroachment, fly-tipping and changes to hydrology related, amongst others things, to sea level rise. Although one of the largest open-spaces remaining on Bermuda, it is currently little used or valued by most Bermudians. Most importantly, there is considerable potential for the site to become a greater resource for the enjoyment, education and understanding of the natural heritage of Bermuda by residents and visitors alike. When combined with habitat restoration and other enhancement opportunities, this site has potential to be much more valuable to both wildlife and the community. The group hopes that this potential will be realised and acted upon by the appropriate authorities and NGOs in Bermuda and will also be properly acknowledged by designation as a Ramsar site. Some actions, such as preventing further industrial and unauthorised encroachment into the site, require urgent attention.

The features of interest of the site and the management issues are summarised in Annex 1 whilst a rudimentary management plan for the site is provided in Annex 2.

Our visit to the site, and our discussion and conclusions, were immeasurably enhanced by the local guides (listed above) to whom we extend our grateful appreciation.

Industrial area on East Marsh

Annex 1 – Evaluation of features and issues of importance

Feature of importance/issue	Approach to solving problems	Measurable conservation objective
Features of interest		**Ideal (long term) objectives**
Largest peat marsh / basin mire (consisting of two peat basins) on the island (likewise freshwater lens), comprising predominantly native vegetation and containing rare / scarce species. Peat has a depth of up to 12m.	Wetland is of considerable importance in a Bermudian context. Peatlands are a wetland-type which are under-represented in the Ramsar series (as are wet grasslands). Issues of changes in hydrology, industrial encroachment and alien species. Site contains a fossil archive of changes in Bermuda's vegetation over the Holocene.	To maintain / restore an intact, functional peatland system comprised of native vegetation
Woodland on northern hillside – predominantly non-native – separated from basin mire by minor road	Valuable area of woodland (for birds, landscape etc) even though dominated by non-native vegetation.	To restore to native vegetation a large block of native woodland and to restore its ecological continuity with adjoining wetlands.
Largest open space on island – provides a feeling of wildness – especially when combined with surrounding land-uses (*e.g.* golf course)	Although large open space, most of the land is not readily accessible to the public and the space is under-valued and under-used. Significant potential for education and enjoyment which is not currently realised.	To enhance the educational, recreational and research value of the site within a coherent identity
Issues		**Operational objectives**
Alien species	1. The eastern basin does not have a significant problem of invasive plant species and those present could be eradicated. 2. The same is not true of the western basin where, for example, *Phoenix* palms have invaded hammock vegetation and little control work has been undertaken so far. 3. Much of the northern hillside is composed of non-native trees and shrubs but is valuable for birds etc regardless. The woodland could be progressively restored whilst retaining the value and visual continuity of the woodland cover. 4. There is a feral cat feeding station within the woodland, which increases predation pressure on nearby breeding birds and there are red-eared terrapins *Trachemys scripta elegans* in the marsh. The former at least should be re-sited elsewhere or the cats controlled.	Eradicate alien plants from eastern basin by xxxx. Initiate measures to control further spread of alien plants in west basin (ongoing). Maintain current extent of open wet grassland (through traditional land management of grazing and fodder cutting). Restore woodland northern hillside to native species incrementally (x% *per annum*). Control non-native fauna (cats) - by re-locating feeding station by 2005 or by introducing lethal control.

Note: These Annexes indicate by x or xxx etc targets which would need to be decided by the local managers.

Habitat restoration	1. The two basins were cedar-dominated swamps until the cedars were destroyed by fires. Some cedars still remain on the site but these are dying due to water level changes (see below). Restoration to original condition is unlikely to be achievable and seral progression (dependent on hydrology) is likely. 2. Woodland restorable to native vegetation over a long period. However, there is a valuable opportunity to restore some ecological continuity between the woodland and the wetland by closing and removing a section of the road round the northern edge of the eastern basin (leaving access to equestrian centre and houses at each end). 3. Scope to use central industrial section for native woodland planting (drier ground is suitable for native cedar).	Restore northern hillside to native woodland incrementally (x% *per annum*). Seek protected status (Woodland Reserve) under local planning regulations for northern hillside. Restore ecological continuity between marshland and northern wooded hillside by closing and removing northern perimeter road (where not required for access). Restore a native woodland element to central industrial section.
Land tenure / site protection	1. Whilst a few parts of the site are in conservation management (National Trust & Audubon Society), the remainder is in the hands of several private owners. Most owners are concerned with the potential future value of the land for development (encouraged by unopposed encroachment). Conservation management is thus inhibited. It is thus imperative that the wetlands are given clear protected status in development plans by Government so they can be acquired (or managed, *e.g.* by easements or management agreements) by conservation organisations at the open space value as opposed to development land price, as soon as possible.	Extend by acquisition or agreement the current reserves holdings to cover both peatland basins by [2010]. Give protected status to the wetlands in development plans as a priority (immediate).

Ramsar designation	1. The site seems to meet criterion 1 of the Ramsar convention for identification as a wetland of international importance. 2. This designation can seemingly not be applied on Bermuda unless the land comes into conservation management	Identify the site as a candidate wetland of international importance (Ramsar site) in local plans (immediate). Pursue Ramsar designation following reserve acquisition.
Uncontrolled fires	1. Major unplanned fires occur once a decade or so. Large fires originally responsible for shift in vegetation from cedar-dominated forest to fire-climax savannah vegetation now. Fires are left to burn out once they have started as impossible to control. Despite the damage they cause, at least one species (the endemic St Andrews cross) is only found after fires. Fire control / limitation may also have significant public safety benefits were any of these fires to spread beyond the marsh.	Reduce risk of uncontrolled fires on peatland basins (by creating fire ditches / open water).
Availability of open water	1. This is currently limited but could be expanded to increase the value of the site to breeding / passage and wintering waterbirds (especially given that Spittal Ponds are now less attractive to shorebirds than hitherto). Suitable wader scrapes could enhance the recreational value of the site to birdwatchers. Creation of open water in the mires could also act as firebreaks to limit damage from uncontrolled fires (or permit controlled burning if desired). Costs of machinery hire suggest this is best done in as few stages as possible – i.e. not piecemeal. It may be necessary to develop a floating ditch dredger for keeping fire breaks open (similar to sludge pumps in Norfolk Broads ditches ?).	Increase extent of open water habitat (scrapes for shorebirds, deeper firebreaks) – linked to objective above.

Hydrology (water abstraction / sea level rise)	1. Indications that with rising sea level the water-table is rising. Some cedars remaining on the marsh now dying (not clear if simply due to water-logging or to saline intrusion). Water is also abstracted from the margins of the site. Impacts of this activity are not known but are thought to be benign? Regardless, changes in hydrology likely over time (and if led by sea level rise then outside control) with implications for vegetation.	Monitor changes in hydrological character of the site (e.g. saline intrusion, water level rise, water abstraction) and associated vegetation change (ongoing / fixed intervals)
Rare species management	1. A number of rare species – sedges and ferns – occur on the site. These may require management individually tailored to their requirements. Maintenance of traditional grazing (or cutting) management vital for some species. Need to understand how their requirements relate to, grazing, burning, water levels and water quality. 2. Further survey is required for the site, especially less conspicuous species, and comparative study with other wetlands would be an advantage. 3. A small part of the eastern marsh is used as a native plant nursery by the National Trust. This is a valuable resource for ecological restoration throughout the island.	Maintain appropriate habitat for key rare species (sedges / St. Andrew's Cross / ferns?) and monitor population status and distribution. Undertake further survey of rare species on the site and determine autecological requirements. Maintain / regularise the use of the native species nursery in the eastern marsh.

Traditional grazing / fodder management	1. Low intensity grazing and fodder cutting around parts of the site are important in creating more diverse range of vegetation types (notably wet grassland), in suppressing the spread of some invasive aliens and in increasing the availability of open habitats for shorebirds and some of the rare sedges. A study of how these practices benefit wildlife would be useful. 2. Wet grassland is also listed as an under-represented habitat for Ramsar sites.	Maintain current extent of open wet grasslands (through traditional land management of grazing and fodder cutting). If necessary, support viability of traditional land management practices, for example by area payments similar to agri-environment schemes.
Recreational uses – birdwatching / quiet enjoyment / lack of access / environmental education	1. Little recreational use at present. Visitors constrained to walking / driving around the margins of the site. Closure of under-used road would enhance these facilities. 2. Birdwatching is popular but no facilities for either watching birds (e.g. hides / towers) or for attracting birds (e.g. scrapes). 3. No interpretation (signs, boards) or trails / boardwalks available to inform public of interest of the site. 4. No coherent identity for the site and site apparently not valued by much of the island. Scope to 'badge' the area and combine interests into a package combining conservation, education and enjoyment under a common theme: e.g. '*Dark and peaty heart of Bermuda*', '*Wild heart of Bermuda*'…. 5. Central industrial section originally earmarked as a playground / park for local children. 6. Scope to use Monarch butterfly *Danaus plexippus* as flagship species for western basin.	Create a coherent identity / badge for the site by xxxx. Enhance public awareness, understanding and enjoyment of the natural heritage features of the site. Replace central industrial use with a central public focus for the site (e.g. comprising car park, native woodland planting, playground, observation tower, interpretation…..) within 5 years. Enhance opportunities for quiet enjoyment of the site including : • create scrapes for shorebirds & hides for birdwatchers; • close northern perimeter road (where access not required) and convert to walking trail; • provide boardwalks and observation tower to enable better appreciation of marshland habitat; • provide training and materials for use by local birdwatching / nature guides; • identify possible natural wetland products for promotion of wetlands to islanders.

Research interest	1. Scope to increase research into the site, e.g. into development of vegetation through the Holocene, benefits of grazing / cutting to wildlife or autecology of rare species.	Undertake or encourage further research into: • vegetation development during the Holocene (through pollen analysis in peat cores taken from this and other peatlands on Bermuda); • autecology of rare species; • value of traditional land management to wildlife.
Industrial encroachment	1. Industrial section in eastern basin is being extended by illegal dumping in flagrant violation of planning regulations. This threatens the hydrological integrity of the eastern basin (if not the whole site) and will, if not controlled, split the eastern basin into two smaller (and thus more vulnerable) hydrological units. 2. Central industrial section is in National Trust ownership but has a sitting tenant. Lease expires soon giving opportunity to return to more favourable land use. There are various options that might arise: the group strongly felt that the strategic importance of the area for Bermudian nature conservation values was such that every opportunity should be taken to move the management of the site to one whose primary objective is nature conservation, rather than industrial or other uses. 3. Some industrial sites and major roads close to the wetland pose a pollution risk, especially oil. 4. Expansion of the equestrian centre potentially threatens further areas of the northern hillside woodlands.	Prevent further illegal encroachment (building / tipping) on to site (immediate). Require developer to restore, or fund restoration of, damaged areas to original condition (if feasible). Publicise the high cost of building stable structures on peat or remedying sinking warehouses. Replace central industrial use with a central public focus for the site (e.g. comprising car park, native woodland planting, playground, observation tower, interpretation…..). Undertake pollution risk assessment and put in place contingency plan for oil or other industrial pollution of the wetland. Constrain future expansion of the equestrian centre where this would have a further detrimental impact on the hillside woodland.

Fly-tipping / illegal dumping of rubbish	1. Fly-tipping and casual dumping of rubbish is a chronic problem rooted in traditional Bermudian view of wetlands as places to dispose of rubbish. Issue detracts from aesthetic value of the site. 2. The dumping of garden refuse also provides a conduit for the establishment of further alien plants in the site and so has the potential to rapidly undo alien species clearance work. 3. Scope to reduce this problem by closing road round northern edge of eastern basin (see above). However, this problem needs also to be addressed in an holistic Bermuda-wide approach to waste management / re-cycling etc.	Enhance public awareness, understanding and enjoyment of the natural heritage features of the site. Close northern perimeter road where access not required. Address waste disposal policy / education issues at Bermuda-wide level (especially fly-tipping, disposal of domestic rubbish & garden waste & re-cycling policy and practice).

Annex 2: Outline management plan – Devonshire Marshes

Ideal (long-term) management objectives

- To maintain / restore an intact, functional peatland system comprised of native vegetation
- To restore to native vegetation a large block of woodland (northern hillside) and to restore its ecological continuity with adjoining wetlands.
- To enhance the educational, recreational and research value of the site within a coherent identity

Operational objectives

Wetlands

- Extend, by acquisition or agreement, the current reserves holdings to cover both peatland basins by [2010].
- Formally identify the site as a candidate wetland of international importance (Ramsar site), and give protected status to the wetlands, in local development plans as a priority (immediate).
- Pursue Ramsar designation following reserve acquisition.
- Eradicate alien plants from eastern basin by xxxx.
- Initiate measures to control further spread of alien plants in west basin (ongoing).
- Maintain current extent of open wet grassland (through traditional land management of grazing and fodder cutting).

Fodder harvest (BP)

- If necessary, support viability of traditional land management practices, for example, by area payments similar to agri-environment schemes.
- Reduce risk of uncontrolled fires on peatland basins by creating fire ditches / open water (as soon as feasible).
- Increase extent of open water habitat (scrapes for shorebirds, deeper firebreaks) – linked to objective above (as soon as feasible).
- Monitor changes in hydrological character of the site (e.g. saline intrusion, water level rise, water abstraction) and associated vegetation change (ongoing / fixed intervals)

Pool area, important for birds (BP)

- Maintain appropriate habitat for key rare species (sedges / St. Andrew's cross / ferns) and monitor population status and distribution.
- Undertake further survey of rare species on the site and determine autecological requirements.
- Prevent further illegal encroachment (building / tipping) on to site (immediate).
- Require developer to restore, or fund restoration of, damaged areas to original condition (if feasible).
- Undertake pollution risk assessment and put in place contingency plan for oil or other industrial pollution of the wetland.
- Publicise the high cost of building stable structures on peat or remedying sinking warehouses.

Hillside woodlands

- Restore woodland on northern hillside to native species incrementally (x% *per annum*).
- Control non-native fauna (cats) - by relocating feeding station by 2005 or by introducing lethal control.
- Seek protected status (Woodland Reserve) under local planning regulations for northern hillside.
- Restore ecological continuity between marshland and northern wooded hillside by closing and removing northern perimeter road (where not required for access).
- Constrain future expansion of the equestrian centre where this would have a further impact on the hillside woodland.

Enjoyment / understanding / research

- Create a coherent identity / badge for the site by xxxx.
- Enhance public awareness, understanding and enjoyment of the natural heritage features of the site.
- Replace central industrial use with a central public focus for the site (e.g. comprising car park, native woodland planting, playground, observation tower, interpretation) by 2008.
- Restore native woodland element to central industrial section.
- Maintain/ regularise the use of the native species nursery in the eastern marsh.

Trust nursery (BP)

- Enhance opportunities for quiet enjoyment of the site including :
  - o create scrapes for shorebirds & hides for birdwatchers;
  - o close northern perimeter road (where access not required) and convert to walking trail;
  - o provide boardwalks and observation tower to enable better appreciation of marshland habitat;
  - o provide training and materials for use by local birdwatching / nature guides;
  - o identify possible natural wetland products for promotion of wetlands to islanders.
- Address waste disposal policy / education issues at Bermuda-wide level (especially fly-tipping, disposal of domestic rubbish & garden waste, re-cycling policy and practice).
- Undertake or encourage further research into:
  - o vegetation development during the Holocene (through pollen analysis in peat cores taken from this and other peatlands on Bermuda);
  - o autecology of rare species;
  - o value of traditional land management to wildlife.

Hungry Bay Mangrove Swamp

Leader: Andrew Syvret; rapporteur: Joseph Smith-Abbot; local expert: Annie Glasspool

Syvret, A., Smith-Abbot, J., Glasspool, A.F. & Stroud, D. 2003. Hungry Bay Mangrove Swamp. pp 212-216 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Background site description

View west, with sea to left and a glimpse of the Bay to right (MP)

Status
Ramsar site (classified 10 May 1999)
National Nature Reserve
Tree Preservation Order protects the mangroves

Ramsar criteria
The site is listed under the following criteria:

1 A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

2 A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

3 A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

4 A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

8 A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

(Note that a clearer justification of these importance features would be desirable for this site.)

Size: 2.01 ha

Principle biotopes
Tidal mangrove swamp at edge of shallow marine bay

Eastward view into the Bay with main mangrove area at right (MP)

Description and ecological features
(Information largely taken from Ellison, J.C. 1991. *Hungry Bay Mangrove Swamp, Bermuda. Present condition and future management.* Report of Bermuda Biological Station for Research, Inc. 27 pp. and Ramsar Information Sheet for Hungry Bay Mangrove Swamp)
Bermuda's largest tidal mangrove swamp located in a shallow (mostly c. 1 m deep) sea bay with a relatively narrow opening to the sea. It is the largest example in Bermuda of the most northerly mangrove swamps in the world. Hungry Bay has the longest continuous sequence of mangrove peat layers in the Atlantic and the first documented evidence of significant mangrove forest retreat caused by contemporary sea-level rise.

Closer view of mangrove in above photo (MP)

The swamp supports important populations of endangered native crabs (the last Bermudan refuge for several crustacea — including largest remaining population of Land Crab *Cenobita clypeatus* and Giant Land Crab *Cardisoma guahumi*), as well as wintering birds.

Noteworthy flora
Both the two mangrove species to occur on Bermuda are found here: Black Mangrove *Avicennia germinans* and Red Mangrove *Rhizophora mangle.* Surrounding woodlands have a range of other trees including Buttonwood *Conocorpus erectus,*

On the south-east edge of the mangrove swamp there are areas of marsh plants, with Large Marsh Rush *Juncus acutus,* Sea Purslane *Sesuvium portulacastrum,* Sea Ox-eye *Borrichia arborescens,* Sea Lavender *Limonium caroliniatum, Paspalum vaginatum, Sporobolus virginicus,* Woody Grasswort *Salicornia perennis* and West Indian Grass *Eustachys petraea*. These areas are not extensive, but are of interest as they illustrate the position of Bermuda on the northern margin of tropical mangrove distribution and on the southern margins of temperate saltmarsh distribution.

Noteworthy fauna
A wintering area for Great Blue Heron *Ardea herodias,* Yellow-crowned Night Heron *Nyctanassa violacea,* Snowy Egret *Leucophoyx thula,* Mallard *Anas platyrhynchus,* Belted Kingfisher *Ceryle alcyon* and Northern Waterthrush *Seirus noveboracensis.*

The swamp supports the only significant surviving populations on Bermuda of the Giant Land Crab *Cardisoma guanhumi* (two colonies on the upper fringes of the mangrove swamp) and is the only location in Bermuda for the Land Hermit Crab *Cenobita clypeatus* (total of 54 individuals in 1990). The Mangrove Crab *Goniopsis cruentatus* also occurs. A numbers of other mangrove-living crustacea occur.

Site vulnerability and management statement
The combination of sea-level rise, storms and human disturbance in the last few decades have caused the retreat of the mangroves and the future of the forest is threatened. Mangroves formerly extended some 80 m further into the bay than they do now, and the present seaward fringe of mangroves is dying due to peat erosion and wind-felling of trees during storms and hurricanes. Turbulent ocean water is affecting this sensitive mangrove zone through a new gap in the peninsula.


Mangrove forest floor swept by currents (MP)


Mangroves from the gap (MP)

Construction of mangrove creeks in the last 40 years (to enable boats to reach private properties bordering the swamp) has channelled and accelerated inter-tidal water movements within the forest. The ebb currents are particularly rapid and strip the mangrove peat surface of leaf litter that normally contributes to peat formation, and also causes creek bank erosion.

Human disturbance enhances creek bank erosion, particularly from the effects of motor propellers and the mooring of boats during stormy conditions to sensitive creek-fringing roots. Peat erosion from the inter-tidal mangrove swamp and sediment deposition sub-tidally in Hungry Bay are classic sedimentary responses to rising sea-levels. This has resulted in a shallowing of Hungry Bay.

Some suggested management responses include:

- Stabilisation of the eroding outer edge of swamp
- Replanting of mangrove propagules on eroding swamp edge and creek banks
- A ban on motorised boats and jet-skis in mangrove creeks
- Closure of the new gap in the peninsula to reduce water flows in bay
- Boom across creek mouth to increase litter retention within the swamp
- Infilling of creeks no longer used

Active management at this swamp will contribute to knowledge of how to assist global mangrove

Mangrove plantings in protective tubes (MP)

swamps during sea-level rises predicted for the next decades.

Possible management issues to explore on site:
Sea level rise and effects of storms – management response? Erosion of the protective peninsula potentially threatens whole habitat, yet this area is not included within the Ramsar site (boundary is drawn tightly around just the mangrove area). What are the implications in terms of management control?

What other off-site factors influence the management of the site? How might these be addressed?

Any significant disturbance from boat traffic using bay? Pollution from boats?

Channels have been cut through the mangroves to enable boats to reach private properties bordering the swamp — education and public awareness issues??

Erosive forces are less at higher levels in the swamp (MP)

Any invasive species issues and their management?

There is significant garbage pollution in the Hungry Bay swamp: at the seaward edge this derives from the ocean (flotsam and jetsam). At the north end of the swamp, there are areas of dumped household garbage. Management responses?

Monitoring needs for the various management responses?

Report of Field Workshop

Participants
Andrew Syvret, Joseph Smith-Abbot, Annie Glasspool, Roy Osborne, Tara George, Richard White, Lyda Varlack, Clive Petrovic, and others.

Conclusions
(Report on next page)

The field workshop team in action (FM)

Conservation Objectives
Policy: Protect mangroves at Hungry Bay for the foreseeable future

Feature of importance/issue	Approach to solving problems	Measurable conservation objective
Integrity of mangroves is breached through the formation of channels to increase boat access	Mangrove replanting within the channels in order to block incoming marine debris	Re-establish and conserve mangrove integrity
Areas of interest are outside of the Ramsar site. Impact of activities within and outside of the site require additional protection	Extension of the Ramsar site designation to include areas currently excluded, but which form an integral part of the wetland complex, in order better to conserve the ecological and hydrological integrity of the site. Areas to be included are a peninsula, a shallow area currently degraded as a result of increased tidal activity and areas adjacent to the mangrove within the bay	Prevent further erosion and restore mangroves to former condition and extent
Casuarina sp. are crowding areas within fringe of the mangrove swamp, potentially impacting giant land and hermit crabs. May also have an impact on endemic snails found within. Area provides habitat for the highest concentration of crabs on island	Removal of *Casuarina* and replanting with native succulent or fruity species which may provide food for local species of interest	Minimally maintain the crab population size and feasibly enhance in the future
Casuarina is widespread along the peninsula which was formerly intact and now is breached by the creation of a new inlet. This is promoting the loss of mangroves along portions of the bay and potentially the loss of longtail (= White-tailed Tropicbird *Phaethon lepturus*) nesting sites	Removal of *Casuarina* from the peninsula with ongoing maintenance subsequently to reduce further breakage of substrate and reduction of nesting sites	Promote values of the natural breakwater and conserve integrity of the site from further erosion
Feral pigeons are displacing tropic bird nest displacement within the site	Trapping in other places where it may be feasible to do so. Shoot pigeons within the area	Promote re-colonization and nesting
Public access to the site is limited and only possible through private lands. Debris and garbage found within limited areas within the site	Public access will not be encouraged. Periodic clean ups, education of adjacent landowners will be undertaken, plan for pollution control will be developed	Reduce rubbish accumulation and minimize pollution presently and in the future
There is built heritage presently covered by vegetation	Need to remove vegetation to expose ruins (this issue is viewed as a low priority)	Conserve and restore heritage. Secondarily, sea bird nesting may be encouraged
Dredging may have occurred resulting in the loss of sea grasses and potentially promoting the loss of mangroves along the western corner	Ban dredging in order to avoid continued deepening of bay, with consequent redistribution of sediments from shallow areas to deeper areas. Explore possible local replanting with mangroves from local stock (already experimentally demonstrated) to help retain sediments within bay.	Restoration of mangrove integrity and potentially, the restoration of seagrass community
Colonization by invasive large marsh rush (*Junctus acutus)* along the second largest salt marsh. *Casuarina* colonization along the fringe of the mangrove. Loss of rare endemic Bermudan palmetto trees *Sabal bemudana* from the site.	Phased removal of invasive species and replanting with local trees such as white cedar, palmetto and olive wood	Restore natural communities in lands adjacent to the mangrove swamp

Spittal Pond

Leader: Rapporteur: Sarah Sanders; local expert: Andrew Dobson

Sanders, S., Dobson, A. & Stroud, D. 2003. Spittal Pond. pp 217-222 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Background site description

Status
Ramsar site (classified 10 May 1999)
Nature Reserve under 1975 Protection of Birds Act & 1986 National Parks Act
Part of a larger National Park

Spittal Pond from the east (EC)

Ramsar criteria
The site is listed under the following criteria:

1 A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

3 A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

(Note that a clearer justification of these importance features would be desirable for this site.)

Size
Nature reserve = 36.4 ha
Ramsar site = 9.53 ha

Principle biotopes
A non-tidal permanent shallow brackish lagoon with fringing mudflats and salt marshes.

Description and ecological features
(Information from Ramsar Information Sheet for Spittal Pond and the Spittal Pond Management Plan 1988)

The only Bermudan example of a non-tidal permanent shallow brackish lagoon with fringing mudflats and salt marshes. The land area comprises a natural valley containing a brackish pond of 36.4 ha and some 1.4 km of rugged coastline. The site is subject to periodic sea flooding with mudflats exposed at low water levels. The water level fluctuates by about 75 cm with rainfall and periodic flooding. Two freshwater ponds were excavated in 1966.

Closer view of part of Pond (BP)

Coast and boiling reef at Spittal Pond (BP)

The Pond holds an extremely nutrient rich but unstable community with wide fluctuations in salinity. There is low species diversity in the pond but very high productivity in boom and bust cycles.

The most important Bermudan wetland for wintering waterfowl and migrant shorebirds.

Spittal Pond features some of the best representation of geological formations in Bermuda.

Noteworthy flora
Submerged beds of *Ruppia maritima* and fringing *Paspalum vaginatum*. Adjacent woodland and pasture.

Noteworthy fauna
The pond is a major refuge for passage shorebirds, notably species of *Tringa*, *Limnodromus* and

Bird-watching at Spittal Pond (EC)

Calidris. It is of principal importance as a wintering area for many species of north American heron, egrets, ducks, coot and moorhen: Pied-billed Grebe *Podilymbus podiceps*, Little Blue Heron *Egretta caerulea*, Louisiana (tri-colored) Heron, *E. tricolor*, Snowy Egret *E. thula*, Great Egret, *Casmerodius albus*, American Black Duck *Anas rubripes*, Teal *A. crecca*, American Wigeon *A. americana*, Blue-winged Teal *A. discors*, Ring-necked Duck *Aythya collaris*, Lesser Scaup *A. affinis* and American Coot *Fulica americana*.

The eel *Anguilla anguilla* is common, *Mugil sp.* occasionally become established.

The fish *Gambusia holbrooki* is abundant serving both as mosquito control and food for herons.

Social and cultural values
The site is one of Bermuda's most important passive recreation areas, used for both walking and birdwatching. The outstanding scenic, historic and natural history value of this area was recognised from the late 19th century, with the listing of the area in many early tourist guides to the island.

- Aesthetic
- Conservation education (birdwatching, natural history and schools tours)
- Livestock grazing
- Non-consumptive recreation (jogging, horse-riding, walking, kite-flying)
- Consumptive recreation (shoreline fishing)
- Tourism

Site vulnerability and management statement
There is some eutrophication as a result of runoff from adjacent dairy farm. Measures have been taken to reduce eutrophication by redirecting runoff from the farm, and introducing a valved pipe to the sea to control salinity. However, soil erosion and sheet run-off of manure into the pond causes eutrophication and increased biological oxygen demand, with impacts on wildlife.

Occasional occurrences of botulism occur in the summer. Domestic pigeons from the dairy farm nest in the coastal cliffs compete with the nesting White-tailed Tropicbirds *Phaethon lepturus*.

In 1954 a protective fence was erected around the perimeter of the pond. In 1955, following the loss of the dense cedar forest due to scale insect epidemic of the late 1940s, the government reforested the land south of the pond with non-native *Casuarina*.

The site has been notified for its nature conservation interest under several pieces of National Legislation. Part of the site was declared as a nature reserve under the Bermudan National Trust Act. It was designated as a nature reserve under the Protection of Birds Act 1975 along with the surrounding areas and scheduled as a nature reserve by the Bermudan National Parks Act, 1986. The Bermuda National Trust has improved the sanctuary by erecting two additional small ponds for waterbirds between the main pond and the sea in 1966 and 1986, and by installing a flushing pipe and valve at the east end of the pond to control water levels.

Current scientific research/survey/monitoring and facilities
No facilities. There has been a limnological study of the pond. Migrating and wintering birds have been monitored and recorded since 1950.

Current conservation education
There are regular field trips by conservation groups and schools.

Current recreation and tourism
The site is used for bird watching and walking by locals and tourists.

Possible management issues to explore on site:
What off-site factors influence the management of the site?

What are the causes and consequences of nutrient pollution from the adjacent dairy farm? How might this and other off-site issues be addressed? Have existing attempts to address this issue been successful? If not, why not?

Cows at the dairy farm beside the Pond (EC)

Can we learn from previous attempts to tackle the issue?

The site receives heavy recreation use. Are there disturbance issues arising and what are the impacts of such use?

Party at west end of Pond (BP)

What interpretive materials are available and how might these be further enhanced?

Any invasive species issues and their management?

The monoculture of *Casuarina* planted between the pond and the sea in 1955 has attained a dominance

Westward view along coast at Spittal Pond (BP)

and height which is uncharacteristic of Bermuda and is relatively sterile for birds and floral diversity. In particular, the forest is self-seeding and has colonised the coastal zone, blocking scenic views and shading out the native coast flora. The condition has inhibited the recovery or re-establishment of native flora. Elsewhere in the reserve non-native weed trees are blocking scenic views and trails. **What are the management options in this situation?**

Pigeons have multiplied in the reserve as a consequence of the "waste grain" on the dairy farm. They also nest on the coastal cliffs where they may be posing a treat to nesting tropic birds through nest -site competition. Evidence? **Solutions?**

Monitoring needs for the site?

How does one best balance management options on the site for biodiversity features against those for people (enhancement of recreational potential)??

Report of Field Workshop

Participants

Sarah Sanders, Andrew Dobson, Nicola O'Leary, Paul Edgar, Lisa Kitson, Ethlyn Gibbs-Williams, Sarita Francis, Erica Gibbs, Gerard Gray, Niall Moore

Importance

As noted above, some of the important features of Spittal Ponds are:

- the only Bermudan example of a non-tidal permanent shallow brackish lagoon with fringing mudflats and salt marshes;
- an extremely nutrient rich but unstable community with wide fluctuations in salinity - there is low species diversity in the pond but very high productivity in boom and bust cycles;
- the most important Bermudan wetland for wintering waterfowl and migrant shorebirds;
- some of the best representation of geological formations in Bermuda.

In addition, Jeffrey's Hole and the Spanish Rock inscription are of important cultural and historical significance.

Key Threats

1. Invasive species (pigeons, cats, goats, feral chickens, casaurina, asparagus fern, brazilian pepper)

Spanish Rock and inscription (MP, MP, BP)

- loss of longtailed tropicbird nesting sites
- reduction in skink habitat

2. Visitors
   - rubbish (pollution and attraction of rats etc.)
   - inappropriate activities (running, horseriding, mountain biking) cause disturbance
   - erosion of footpaths

3. Farm
   - nutrient runoff and eutrophication
   - feed attracts pigeons
   - goats

Dairy farm beside Pond (MP)

- numbers of cattle

4. Management
   - no signs (interpretive and directional)
   - fence in state of disrepair

Recommended Approaches and Objectives

An approach to these issues is tabulated on the next page.

Trail through Palmetto at Spittal Pond (EC)

Feature of importance/ issue	Approach to solving problems	Measurable conservation objective
Improvement/ restoration of water quality in ponds, and promotion of better environmental management of zones around the site	A catchment management approach is essential to the long-term conservation of this wetland. Adjacent to, and upslope of, the site is a farm stocked at high density with dairy cattle. This has resulted in widescale erosion of pastures (little grass was apparent in the fields at the time of the visit – with much trampled bare soil). The Ponds have been impacted by sediment inputs consequent upon this soil erosion, and probably more significantly, by direct nutrient inputs from the large quantities of cattle manure produced by the farm. These wastes leach into the wetland resulting in significant eutrophication — with associated ecological consequences. Possibly consider options such as management agreement with farm and demonstration-farm for agri-environmental farming practices. Immediate needs are to: • explore means of reducing the herd size to a level that is appropriate to the location and sustainable without causing degradation of the farmland or surrounding impacts; and • explore means of reducing and re-directing run-off from the farm away from the Ponds. Ideally these wastes should be physically contained on site (perhaps used to generate methane in a biogas plant). Alternatively, piping these to the sea might be feasible as long as wastes were discharged into an area of high water dispersal, and did not result in pollution of the inshore or beach environments.	Reduced levels of nutrient loading in the ponds to those more normally experienced in pond systems of this sort. Reduced incidence/ elimination of indicators of abnormally high nutrient loading (such as algal blooms and high biological oxygen demand).
Alien plants	There are significant numbers of alien plants in and around the site. A detailed plan should be prepared listing these, their impacts and assessing the degree to which it is possible to manage, contain or eliminate these species, with monitoring needs included.	Reduced impacts/extent of alien plant species on site
Alien birds (pigeons)	A significant flock of feral pigeons is associated with the cattle farm, presumably taking advantage of cattle food. These apparently compete for nest sites with White-tailed Tropicbirds and other species. There is a need for proactive management (with monitoring) to reduce or eliminate these pigeons. This might be undertaken by: • trapping and culling of pigeons near the farm; • reducing attractiveness of the farm buildings to pigeons; or • reducing food supplies for pigeons through modifying cattle feeding regimes so that spilt food is not readily available for the birds to exploit.	Elimination of feral pigeon flock within three years of commencement of control measures.
Exploitation of the sites significant education potential, and raise awareness of the value of the site	Spittal Ponds receives extremely high levels of recreation use, both for birdwatching but also for walking, jogging and other forms of quiet recreation. Accordingly, the site has a very significant potential for environmental education and public awareness. Whilst there is some signage near footpaths, this is limited and, for example, makes no reference to the status of the sites as a designated wetland of international importance. It would be appropriate to present information to the public on other conservation management being undertaken on or near the site, for example measures to improve water quality (above). Other possibilities include targeting decision-makers and improved nature-trails, as well as ranger work to undertake and oversee work suggested.	Progressive development in the use of the site for environmental education and to develop public awareness.

Pembroke Marsh East

Leader: Michael Brooke; rapporteur: Peter Ryan; local expert: Joseph Furbert

Brooke, M., Ryan, P., Furbert, J. & Stroud, D. 2003. Pembroke Marsh East. pp 223-225 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Background site description

Status
Ramsar site (classified 10 May 1999)

Ramsar criteria
The site is listed under the following criteria:

1 A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

6 A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

8 A wetland should be considered internationally important if it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.

(Note that a clearer justification of these importance features would be desirable for this site.)

Size
7.82 ha

Principle biotopes
An extensive freshwater *Typha* marsh with some open water channels up to 3 m deep

Description and ecological features
(Information from Ramsar Information Sheet for Pembroke Marsh East and *The Pembroke Marsh Plan 1987)*

A freshwater marsh in a peat basin connected to the seas by a 2 km drainage channel. The quality of the water is very significantly adversely affected by leachate from the adjacent dump (although this is no longer actively used for domestic waste disposal). A good example of a *Typha* marsh that drains as an estuarine system into the sea and supports juvenile populations of certain fish species. It is Bermuda's only estuary.

The site regularly supports passage and wintering waterfowl and is an important breeding area for moorhen.

The large capacity of the marsh buffers flooding from Hamilton city runoff during heavy rains.

Noteworthy flora
The largest surviving cattail *Typha augustifolia* marsh on Bermuda, with some *Ceratophyllum demersum* and *Cladium jamaicensis.*

Noteworthy fauna
Formerly the most important breeding area in Bermuda for moorhen *Gallinula chloropus* (>6 pairs) and American Coot *Fulica americana* (1-2 pairs). A wide variety of waterfowl are recorded on passage and in winter, including Pied-billed Grebe *Podilymbus podiceps*. American Bittern *Botaurus lentiginosus*, Least Bittern *Ixobrychus exilis*, Black-crowned Night Heron *Nycticorax nicticorax*, Green Heron *Butorides virescens* (= *B. striatus*), Great Blue Heron *Ardea herodias*, Teal *Anas crecca*, Blue Winged Teal *A. discors*, Ring-necked Duck *Aythya collaris*, Lesser Scaup *A. affinis*, Sora Rail *Porzana carolina* and Purple Gallinule *Porphyrula martinicia*.

The introduced minnow *Gambusia affinus* occurs, and the marsh supports Bermuda's largest populations of North American eel and young tarpon, which gain access to the pond via a drainage ditch connecting to Mill Creek one mile to the west.

Site vulnerability and management statement
Site has been subject to a long history of land-claim and use as land-fill for rubbish. This was initially driven by desire to eliminate mosquito breeding habitats (as Yellow fever vectors). The marsh was included in a wide-scale scheme, launched in 1987, to rehabilitate the Pembroke Marsh Basin so as to improve local social and environmental conditions, especially through the relocation of rubbish disposal operations then occurring within the basin. A major development plan was been established for the basin but appears not to have been implemented?

Other issues include:

- Potential to increase open water habitat and flushing ability
- Expensive equipment needed to do this, but resulting soil and peat could be sold to offset costs
- Former waste dump
- Residents living behind a dump for decades

– stench *etc*.
- Currently dump for horticultural waste
- Ability for underlying rock to absorb and neutralise waste

Current scientific research/survey/monitoring and facilities
Not known

Current conservation education
Not known

Current recreation and tourism
Not known

Possible management issues to explore on site:

What off-site factors influence the management of the site? How might these be addressed?

In particular — what pollution implications arising from leachate from the adjacent rubbish dump? How might this be managed? Assessed?

Any invasive species issues and their management?

Monitoring needs?

Current status of Pembroke Marsh East under the Ramsar Convention

As a result of the severe pollution impacts at Pembroke Marsh East which have resulted in the ecological quality of the wetland having severely deteriorated, the group had doubts as to whether the site still qualified under Ramsar criteria. It seemed that the endemic Kilifish *Fundulus bermudae* and the clam population are probably already extinct (although surveys would be needed to confirm this).

Given the Government of Bermuda's demonstrated commitment to the sustainable and wise-use of the wetland apparent through its listing in 1999 as a Ramsar site, an appropriate next step would be to seek the listing of Pembroke Marsh East Ramsar site on the Convention's 'Montreux Record'. This would then facilitate the provision of further management guidance though the input of a visiting group under Ramsar's Management Guidance Procedure. Such a group could provide more in-depth analysis of problems and solutions than was possible by the short visit by the Conference participants. Such a visiting group might also be able to advise on problems at other Ramsar sites on Bermuda.

Report of Field Workshop: Pembroke East marsh aka "The Dump"

Participants
Michael Brooke
Peter Ryan
Joseph Furbert
Avon Carty
Mike Freeman
Thad Murdoch
Noni Georges

Features of importance/ issues, approaches and conservation objectives

These outputs from the workshop are summarised in the Table on the next page.

Pembroke Marsh and dump from the air

Feature of importance/issue	Approach to solving problems	Measurable conservation objective
Typha and saw-grass reedbeds (dump encroachment)	Stabilise the physical interface between the dump and wetland, stopping active dumping at the wetland edge which is currently resulting in encroachment on the site.	Wetland area constant or enlarged (note a need to monitor the extent of the wetland area so as to be able to assess.
Typha and saw-grass reedbeds (impacts from alien species)	Clearing vegetation and active restoration (through transplantation of native species *etc*.)	Reduce extent of aliens (in terms of coverage and species numbers); greater numbers/extent of native species (note monitoring requirement to be able to assess this)
Extent and quality of open water for birds and ?fish	Leachate from the adjacent road and rubbish dump is polluting the site with nutrient, heavy metals and oil-based chemicals. There is also increased sedimentation into the wetland encouraging reed encroachment in turn reducing the extent of open water. • Creation of an impermeable barrier is necessary to impede lateral leaching from the dump • Dredge parts of the marsh to extend open water areas to benefit of waterbird and fish populations. • Manage road and urban run-off. [Note: it is not clear if there are any remaining fish in the wetland owing to the high pollution levels. This needs to be assessed. In the event of extinction of fish, re-establishment from other sites might be an appropriate action once water quality has improved sufficiently.]	Reduced levels of key nutrients, heavy metals and pesticides in the wetland. Larger populations of birds and fish (see note). Constant or increased open water extent, with higher edge ratio.
'Green Lung' for Hamilton: including educational potential of wetland close to major population centres	Need to physically stabilise and physically plant the dump area. This will require an alternative location for the disposal of garden refuse. Initial steps will require stakeholder meetings to plan the reorganisation of the current garden refuse site. This might involve the use of chippers to create raw organic inputs for a biogas plant creating methane/methanol	Creation of open recreational space adjacent to the wetland, including boardwalk and hide within wetland, with associated signage. Close/reduce activity at the tip-sign to levels that are sustainable in context of long-term conservation of adjacent wetland.
Flood management and hydrological linkage of the marsh to the sea	The site is part of the only 'estuarine' system in Bermuda. It should be a long-term objective to re-establish the functional linkage between the marsh and the sea. Currently poor drainage leads to flooding. There is thus a need to clean-up the existing canal linkage to the sea, possibly through dredging. This activity might additionally involve: • creation of over-spill ponds within the catchment to contain floodwaters; • restoration of bank-side vegetation; • improvement of ecological conditions for fish populations; and • re-creation of a functional estuary.	Clean, flowing freshwater linkage between Pembroke Marsh East and the sea, used by fish populations and other wetland species. Reduced incidence of flooding.

Cooper's Island

Leader: Colin Clubbe; rapporteur: Madeleine Groves; local experts: Jeremy Madeiros, Drew Pettit & Julie Marshall

Clubbe, C., Groves, M., Madeiros, J., Pettit, D., Marshall, J. & Stroud, D. 2003. Cooper's Island. pp 223-230 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Background site description

Status
Part nature reserve (2.6 ha)

Ramsar criteria
Not currently applicable

Size: ca 40 ha

Principle biotopes
Former island now joined to St. David's Island

Description
(Information from Anon. *A cultural, education & environmental opportunity for Bermuda. Proposal for the enhancement of Cooper's Island Nature Reserve by the addition of the NASA Tracking Station lands.* 6 pp.)
Cooper's Island is located on the eastern side of Castle Harbour and juts out into the centre of the Castle Islands. It was a separate island of 31.4 ha until 1943 when it was connected to S. David's Island by dredged fill during the construction of the US Air Force base (now the international airport). Prior to its connection with St David's Island, Cooper's Island was Bermuda's largest, most isolated and ecologically diverse island. Even today it retains most of this diversity and ecological importance because the military and NASA installations have not altered the contours significantly and the superb beaches and coastline remain.

Currently the island comprises partly a limited nature reserve, and partly NASA Tracking Station lands - which will soon be handed back to Bermuda with the closure of that station. The reserve and its associated Clearwater Beach and public spaces are currently of great importance for both recreation and public understanding of the environment. Local people enjoy hiking through one of the last remaining wild and open spaces on the islands.

Bermuda now has the unique opportunity to reclaim the remainder of Cooper's Island as an extension to the current reserve. This may be the last opportunity for protecting the rare natural heritage of Bermuda on a scale sufficient to cater for cultural and eco-tourism, and local education.

There is potential to convert the NASA land and buildings to a national park, resulting in the creation of significant educational and visitor facilities, with associated cultural, environmental and socio-economic benefits.

Noteworthy flora
Several rare species occur, including Seaside Evening Primrose and Bermuda Cedar *Juniperus bermudiana*.

Noteworthy fauna
Proximity to breeding areas of critically endangered Cahow or Bermuda Petrel *Pterodroma cahow*, thought extinct until 1951 and since subject to an intensive recovery programme.

Several rare species occur, including West Indian Top Shells, Green Turtle *Chelonia mydas* and Yellow-crowned Night Heron *Nyctanassa violacea*.

Site vulnerability and management statement

- Proposal to create a nature reserve with paying visitors
- Proximity to Castle Harbour Islands/Nonsuch/Cahow breeding sites
- W & E and BLDC interested in developing area – hotel/cottage colony
- Existing buildings – what to do with them

Narrow strip connecting southernmost former islet to the artificial peninsula (MP)

Islets off Cooper's Island (MP)

Nonsuch Island, from adjacent Cooper's Island (MP)

- Disposal of existing waste
- Proximity to motor sports and noise issues
- Land given up by Bermudians originally – what are their wants/needs?

Current scientific research/survey/monitoring and facilities
Unknown/limited

Current conservation education
Great further potential for cultural and natural history education.

Current recreation and tourism
Considerable asset at present. Significant further potential, especially if NASA land were acquired for a national park.

Possible management issues to explore on site:
Desirable objectives for management of
a) island as a whole?
b) nature reserve component?

Practicality of recreating separation from St. David's Island?

What off-site factors influence the management of the site? How might these be addressed?

Disturbance and management of current visitors to site, and issues related to management of enhanced numbers in the future? Zoning of access? Possible/desirable?

How to integrate recreational values of the island with conservation needs?

Any invasive species issues and their management?

Monitoring needs?

The field workshop team at work at the southern end of the site, with Castle Harbour Islands to the west in the background (MP)

Report of Field Workshop

Participants
Colin Clubbe
Madeleine Groves
Jeremy Madeiros
Drew Pettit
Julie Marshall
Kerstin Swahn
Peter Drew
Sarah Manuel
Karen Varnham
Juliet Rose
Oliver Cheesman
Valerie Caton

Conclusions
The site was fully explored with local and international expertise present. Lots of questions and lively debate ensued. Whilst a whole range of issues were discussed the overriding issue became very clear and everyone recognised the enormous importance of this site and the urgency with which it should be secured for the benefit of Bermuda's people and its biodiversity. The site represents one of the few remaining open spaces in Bermuda and acts as a buffer zone for the critically important offshore islands; within half a mile of the peninsular is the breeding habitat for 40-45% of Bermuda's population of White-tailed Tropicbird *Phaethon lepturus* and the whole world population of the critically threatened Cahow.The value of this site as a buffer zone for these islands cannot be over emphasised.

This site presents a unique opportunity to secure one of Bermuda's last remaining open spaces in perpetuity for both people and nature.

Recognising the specific needs of Bermuda's people, their cultural and natural heritage the future of the site was envisaged as comprising of three components:

1. The existing Cooper's Island Nature Reserve should be retained as a multi-access, recreational site, but restricting vehicular use to the car park and no further
2. The central component including the water catchment area and associated buildings could form the basis of exciting educational museum and visitor centre telling the story of Bermuda's links to NASA as well as showcasing the important biodiversity elements for many different audiences
3. The peninsula itself should act as a buffer zone for the offshore islands where access may require a permit and numbers limited at any one time. Activities should be limited to low-impact activities as bird watching, walking or quiet contemplation

Near northern end of existing reserve, with high volumes of public recreational access (MP)

This categorisation of use will allow a range of income generating possibilities, including car parking fees, museum entrance costs and purchases and permit fees from international and local visitors.

Specific issues raised on site by workshop participants that need to be considered for the future management of this site:

- Invasive animal and plant species
- Site contamination especially lead from spent bullets
- Ensuring the views of the Bermudian public are sought out and incorporated into management planning

Beach towards the southern (more remote) end of the peninsula (MP)

- The need for a full biodiversity survey and environmental impact assessment of the site
- The waters around this site are amongst the best in Bermuda providing the opportunity to link the waters, the peninsula and the offshore islands to ensure the biological integrity of these critical ecosystems
- Renovation of buildings
- Staffing issues
- Bunkers – a potential safety issue

Coney Island

Leader: Brendan Godley; rapporteur: Alison Duncan; local expert: Jack Ward

Godley, B., Duncan, A., Ward, J. & Stroud, D. 2003. Coney Island. pp 231-234 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Background site description

Status
National Park

Ramsar criteria
n/a

Size
6.4 ha

Principle biotopes
Marine pond fringed with mangroves
Rocky shoreline dominated by native plants with shallow bays and sandy beach
Seagrass beds surrounding most of the island
Degraded coastal hillsides with dense stands of *Casuarina*

Description and ecological features
This small island is located on the north side of Bermuda. The western shore faces the north lagoon and is regularly impacted by heavy wind and wave action. Near to this western shore is the remnant of the Bermuda railway track which passed over the island and formerly connected the mainland with St Georges Island. The construction of this railway caused a deep bay which was probably ringed by mixed stands of red and black mangroves (*Rhizophora mangle* & *Avicennia germinans*) to become isolated as an inland pond. Black mangroves dominate in the outer portion of this bay. The pond, which is tidal and fed by uncharted subterranean fissures, still supports mixed stands of mangroves and a seagrass community with numerous marine species. A second, smaller pond created from a sink hole is fed by water from the larger pond by fissures.

The bigger pond and causeway blocking the drainage (JW)

The island's topography is dominated by large, poorly consolidated dunes forming hillsides that

Invasive plant species (JW)

are largely covered by invasive plants, notably; *Casuarina*, Brazilian Pepper and Asparagus fern. The dunes on this island overlay Walsingham formation rock, some of the oldest Bermuda limestone, which is characterised by being very hard and riddled with caves.

Sites of Cultural Significance
At the northern end of the island there is a long breakwater formed of large quarried stone blocks. This site was used for a horse-drawn ferry that, for many years, was the principal connection for terrestrial transport from St Georges to the rest of Bermuda.

The ferry (JW)

Erosion caused by the track (JW)

Site Vulnerability and Management Statement
Despite being a national park, the island has been the site of a motocross track for approximately 30 years, an activity that has led to significant environmental degradation. Massive erosion and siltation of the ponds have resulted. The smaller of these ponds was once a classic marine sinkhole with crystal clear water and a wide variety of fish and crustacean. However, in the late 1980's, a heavy rainfall that followed the use of bulldozers on the track led to this ponds becoming contaminated with soil and fresh water leading to severe anoxia. The fish died and workers recovered dozens of large lobsters that attempted to crawl out of the pond. It is believed that the use of this heavy equipment caused the collapse of the main fissures that supplied the pond. The original conditions have never been restored.

The little pond (JW)

The former railway right of way is now the path of a heavy fuel line that provides all of the fuel to Bermuda's electrical generation plant. Other services including electricity, telephone and cable television cross the island connecting the main island to St Georges.

Large steel culverts that were laid down during construction of the railway in an effort to maintain a connection between the large pond and the ocean are now blocked and probably collapsed.

The buildings (JW)

Current scientific research/survey/monitoring and facilities
There are no known scientific surveys of this island. The island is home to a number of buildings which are home to the marine research and enforcement sections of the Departments of Conservation Services and Environmental Protection.

Current conservation education: None

Current recreation and tourism
The park is heavily used during the summer by campers who make the island their summer home by moving in for months at a time; bringing tents, electrical generators and even refrigerators. Inappropriate behaviour of campers and occasional vagrants has led to large litter problems.

The park is popular for fishing and a beach on the northern coast is heavily used for swimming.

The presence of the scrambling track has prevented the development of a management plan for this park.

Possible management issues to explore on site:
Relocation of the scrambling track – this is an imperative that largely controls all other management options.

Restoration of the water exchange to the smaller pond and/or through the culverts to the ocean.

Elimination of the major invasive plants.

Use of this site as a conservation education facility.

The relatively nice coastline (JW)

Report of Field Workshop

Participants
Brendan Godley
Alison Duncan
Jack Ward
Charles David
Nancy Woodfield
Catherine Leonard
Mat Cottam
Paul Hoetjes
Joelene Foster
Damon Stanwell-Smith
Becky Ingham
Denise Dudgeon
Barbara George

Conclusions

Objective:
Environmental Community Park: to inspire Bermudian youth about their natural heritage

Feature of importance/issue	Approach to solving problems	Measurable conservation objective
Green open space, popular location for local people	Remove scramblers and regrade landscape	Develop a planting scheme. Replant X native trees to revegetate and stablise soil.
Enhance native vegetation	Hands on activity by children. Remove exotics and plant natives.	Remove X n° of trees/year and replant X n° native trees
Pond area, sink hole	Conduct a survey on biodiversity interest	Restoration of pond with mangrove, open the culverts
Coastline	Define usage patterns, garbage collection	Regular (quarterly) coastal clean-ups, camping strategy defined by summer next year
Old buildings	Renovate for environmental education centre	X n° of schools send X n° of students for environmental education course and planting scheme
Horse ferry – 200 years of use	Contact horse club/horse and coaches to explore possibility of reinstating the ferry Displace power boat racing	Restoration of a cultural heritage feature for use during the summer season
Scramble track	Establish agreeable alternative venue and complete for basic use before relocation commenced	Maintain PR profile with current user group
Camping use	Managed facilities regulated use	Minimal impact

Topic 5: Climate change

This short session centred on the effects of global warming and sea-level rise on coral systems, in Bermuda, the Caribbean and the Indian Ocean, with a contribution on the effects of sea-level rise, storm increase and erosion on breeding seabirds in Bermuda.

It had originally been planned to include also contributions from the Antarctic, high temperate latitudes and a global overview, but these latter were not available in the event. Nevertheless, the presentations given cover large topics of major importance.

Chaired by: Martin Drury, UKOTCF (right); and Lynda Varlack, BVI Government Conservation & Fisheries Department (left)

Scientific overview of climate change implications as it relates to small islands

Nicholas R. Bates, Craig Carlson, Dennis Hansell, Rod Johnson, Debbie Steinberg & Tony Knap, Bermuda Biological Station for Research

Bates, N.R., Carlson, C., Hansell, D., Johnson, R., Steinberg, D & Knap, T. 2003. Scientific overview of climate change implications as it relates to small islands. pp 236-243 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

The presentation addresses physical and biogeochemical variability in the North Atlantic Ocean, using perspectives from two long-term oceanographic time-series, Hydrostation S (1954-present) and the U.S. JGOFS Bermuda Atlantic Time-series (BATS) site (1988-present). It focuses on linkages between modes of climate variability (e.g., NAO/ENSO and ocean biogeochemistry). Effects on coral reef ecosystems addressed include coral bleaching and changes in ocean chemistry.

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Acknowledgements

We would like to thank the primary sources for this talk: Dr J. Kleypas, National Center for Atmospheric Research (NCAR) and Dr C. Langdon, Lamont Doherty Earth Observatory (LDEO).

Background

Ecosystems in the recent past are effectively in the geological period of the Anthropocene
- domination of ecosystems by *Homo sapiens*. This species is prolific at biogeochemical (BGC) recycling. This too can lead to ecosystem shifts.

H. sapiens traits:

- top competitor for space (urbanization)
- effective predator (overfishing)
- prolific biogeochemical (BGC) recycler (C, N, P, H20 cycles)
- symbiotic relationships with other species (ranching, habitat protection)

Ecosystem responses:

- habitat loss
- food web adjustment to ecosystem shift
- ecosystem shift: atmospheric CO_2 higher than past 105–106 years
- habitat gain/loss

Importance of Coral Reefs

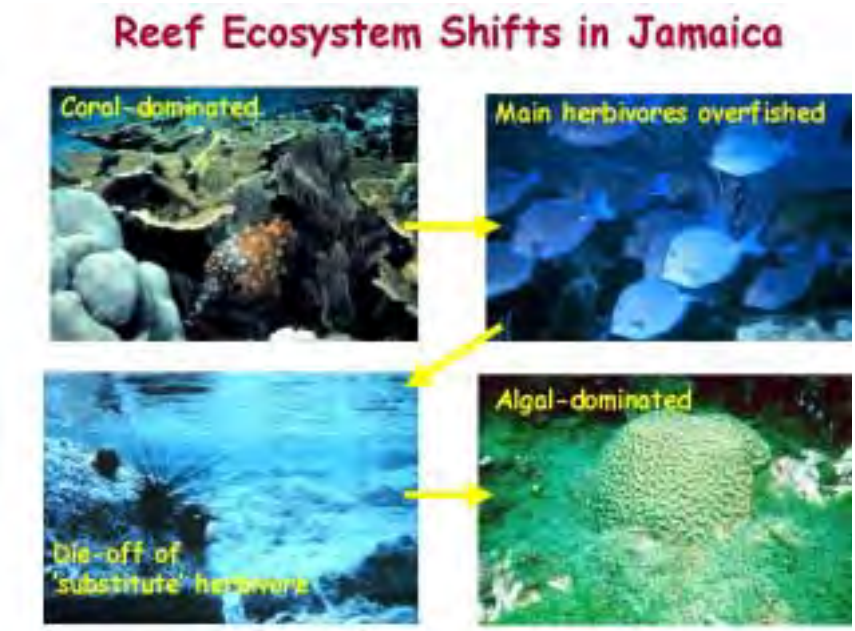
Although interested in the response of ecosystems in general to climate change, we focus on coral reefs, because:

1. Reefs are important marine ecosystems
2. Important for fisheries; in developing countries, they contribute about 25 percent of the food catch, providing food to one billion people in Asia alone
3. Marine biodiversity; they offer great promise for pharmaceuticals now being developed as possible cures for cancer, arthritis, human bacterial infections, viruses and other diseases
4. Buffer adjacent shorelines from wave action
5. They represent an ecosystem that is in rapid decline
   - 25% of all reefs are considered gone
   - about half of these were lost due to climate change

Many ecosystems, particularly coastal ecosystems, are facing problems similar to those that reefs are facing

Coral reefs are in crisis because of:

1. Pollution from poor land use, chemical loading, marine debris, and invasive alien species.



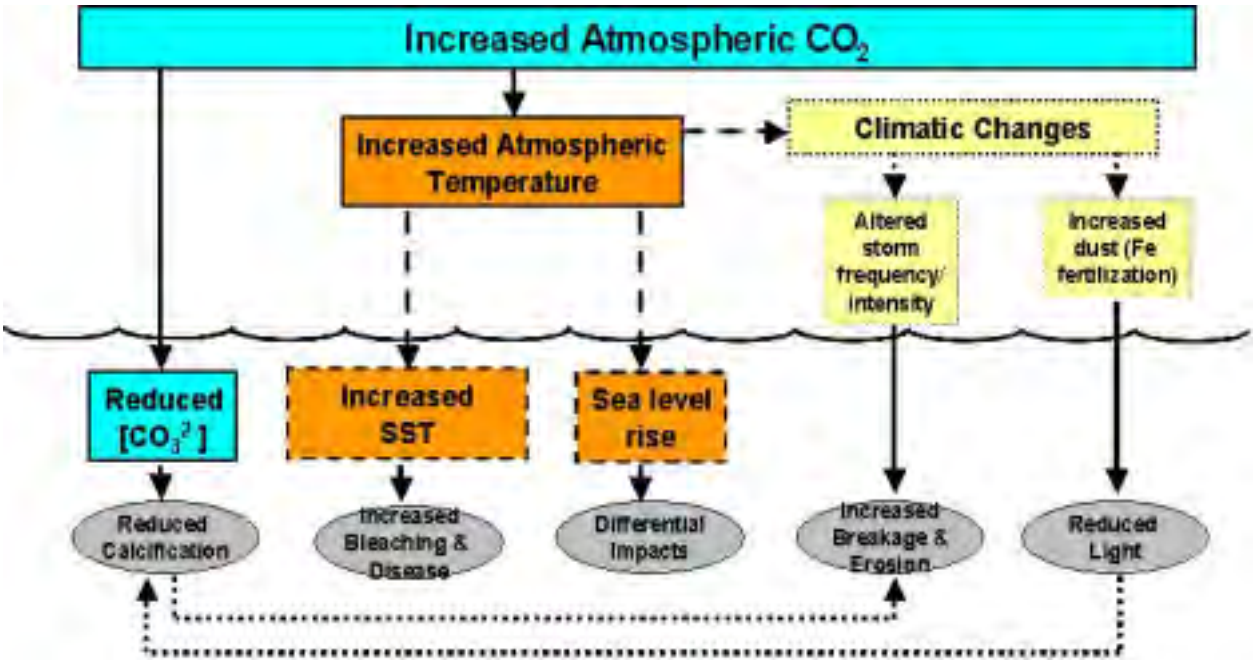
Slide modified from: J. Kleypas, NCAR

drastic reductions of the herbivores – the animals that grazed down the fleshy algae. High biodiversity on reefs usually means that when one functional species is removed – here, the herbivorous fish – another species can fill that position. Once the fish were removed, the task of keeping the algae grazed down fell on the backs of the sea urchin, and they grew in numbers and managed the job. However, a mysterious disease wiped out this species throughout the Caribbean, which left the reef without any grazers, and the Jamaican reef shifted from being coral-dominated to being algal-dominated

2. Over-fishing and related harm to habitats by fishing gear and marine debris.
3. Destructive fishing practices (such as cyanide and dynamite fishing).
4. Dredging and shoreline modification.
5. Disease outbreaks that are increasingly prevalent in reef ecosystems.
6. Global climate change and associated impacts (such as coral bleaching, more frequent storms and rise in sea level).

The illustration above shows the sequence of events on Jamaican reefs. The Jamaican reefs in the 1960s probably looked something like this – high coral cover. Overfishing on these reefs resulted in

This diagram (below) illustrates potential effects of increased atmospheric CO_2 on reefs. Solid lines show the most direct effects (e.g. changes in seawater chemistry are irrefutable). Dashed lines show less certain (albeit not necessarily less important) effects (e.g. increases in temperature). Dotted lines show effects which could happen, but are less directly caused by atmospheric CO_2. This talk focuses on seawater chemistry effects. Here, unlike arguments about whether increased CO_2 will lead to increases in temperature, one does not have to argue over whether seawater chemistry will change.



Coral Bleaching

There has been a dramatic increase in coral bleaching since the 1980s; 15% were destroyed in 1997-98. There is a lack of historical data:

- No written or folklore records of 'white reefs'

And a lack of paleontological data:

- No bleaching signal in coral skeletons
- Large scale die-offs not evident in geological records

To monitoring coral-bleaching:

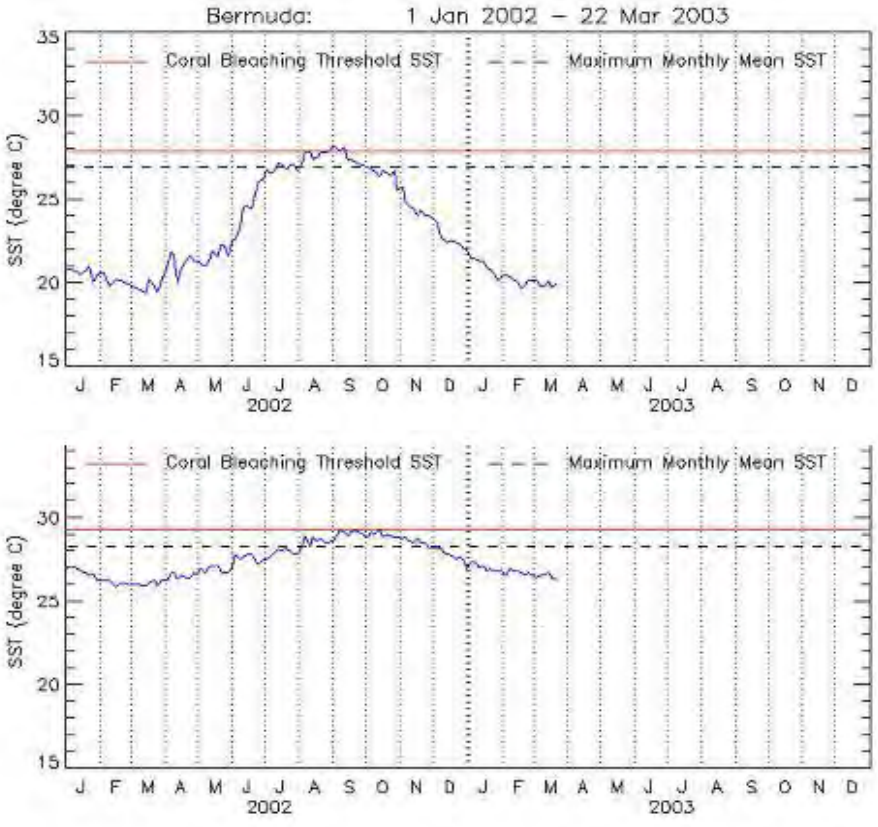
- NOAA-NESDIS monitoring 24 reef sites at present.
- NOAA-NESDIS monitoring global SST for hot-spots, and early warming.

The diagrams below show in blue the surface sea temperatures throughout 2002 and early 2003 in Bermuda (above) and the Virgin Islands (below). The red line shows the threshold for coral-bleaching. The potential was high in Bermuda in 2002. In the Virgin Islands, there was no potential from SST for bleaching in 2002, although there was not much leeway.

Future Coral Bleaching

Climate questions:

1. How much will SST rise?



- future CO_2 rise
- accuracy of models
- future variability
- thermostat hypothesis
- future El Niño intensity/frequency

2. How fast will SST rise?

Biology Questions

1. What is the thermal tolerance of corals?
   - geographical variation
   - species - species variation
   - within-species variation

2. How fast can species adapt?
   - acclimatization
   - "adaptive bleaching"
   - Darwinian adaptation

3. Ecosystem effects

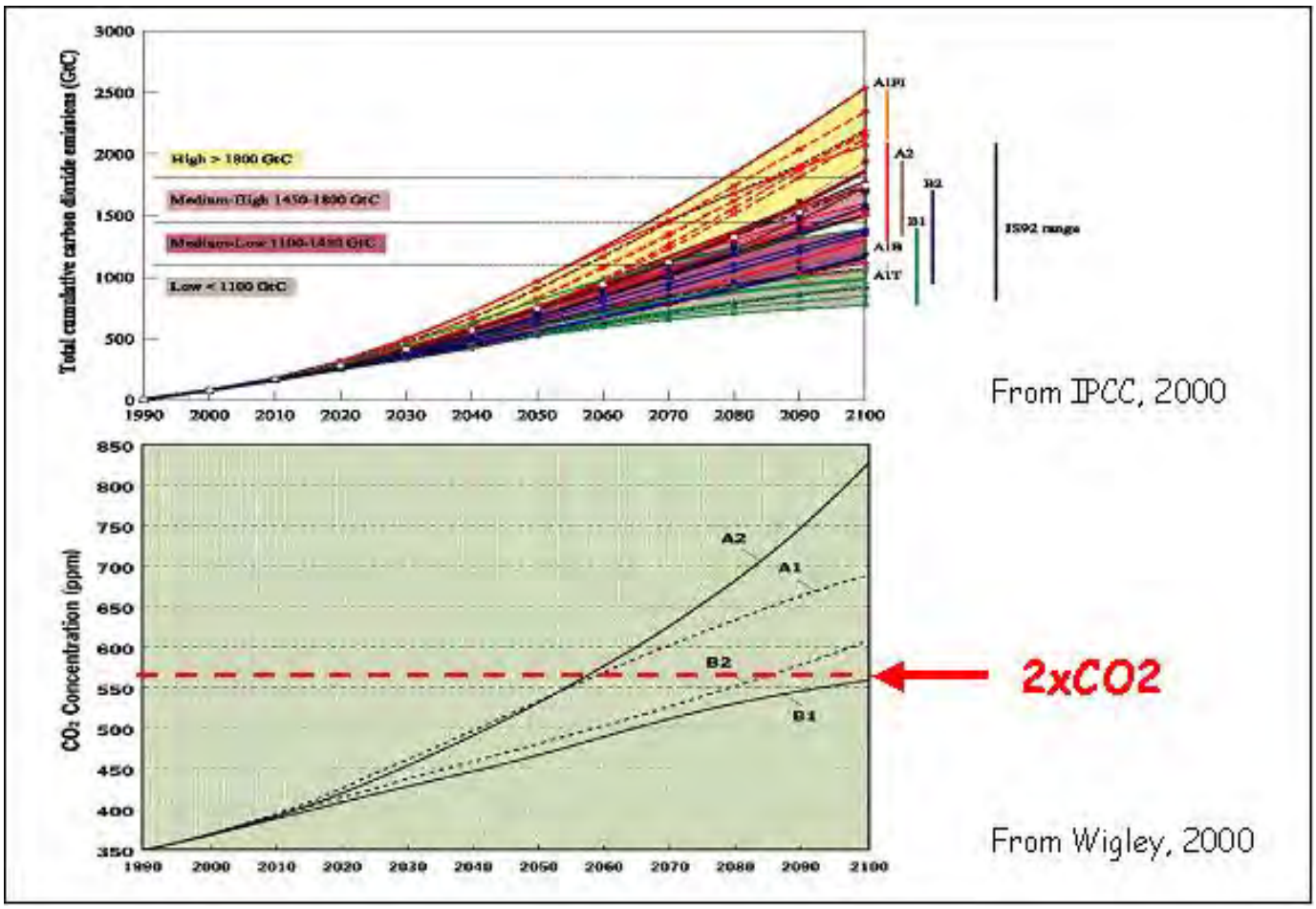
Mass bleaching events occur in El Niño years, so that important points are:

1. Rate of temperature rise versus rate of adaptation
2. Role of temperature variability - are corals from more variable environments better adapted?
3. Role of steady rise in average temperature.

Effects of CO_2 on Coral Reefs

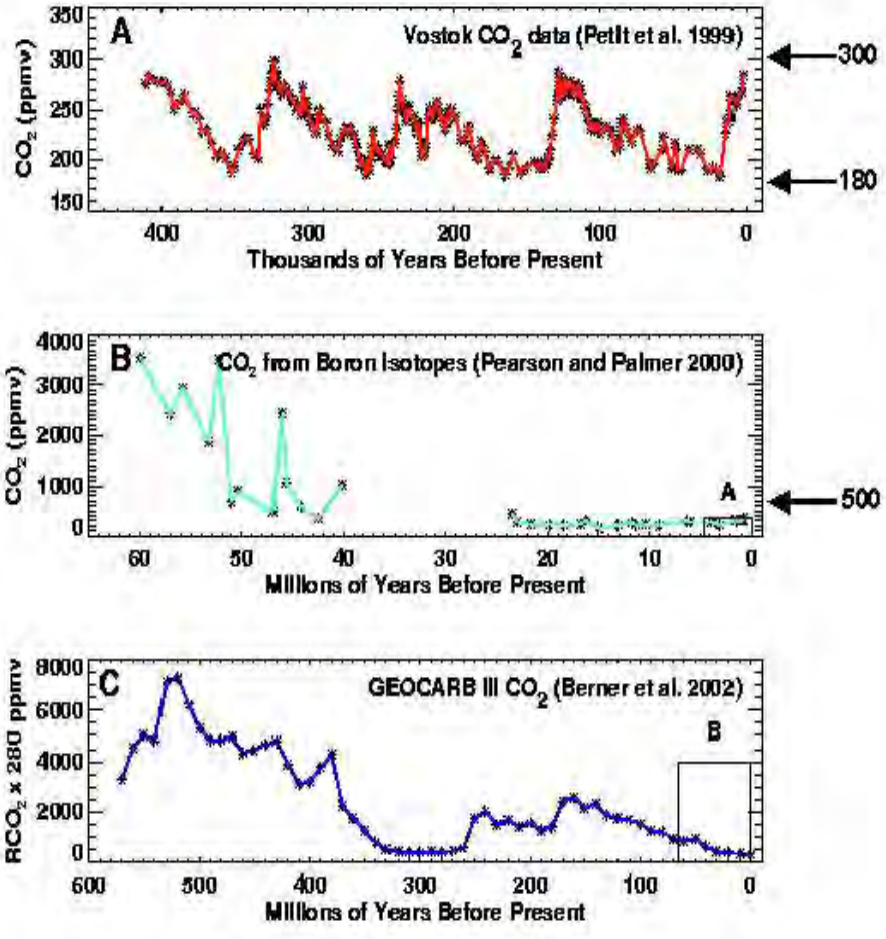
First, we address some of the science about how CO_2 levels are affecting seawater chemistry, and particularly how altered carbonate ion concentration will affect calcification in reef organisms

Atmospheric CO_2 will almost certainly reach twice pre-industrial levels, even if we manage to halt any further emission increases (illustratation at top of next page). Timing of when we will reach double CO_2 varies, but most models point to around 2065. Some researchers carry this further to show that we could indeed reach 3 x CO_2 by the end of



the century.

The main issue that we will address in this talk has to do with more or less direct effects of atmospheric CO_2 on reefs, starting with some background on the historical records of CO_2 concentrations. The top diagram low on the page is the CO_2 record from the Vostok ice core. This record is considered very accurate since it measures CO_2 concentrations fairly directly. The value over the last 420 thousand years has fluctuated between 180 and 300 ppmv. The middle panel is the CO_2 records as derived from boron isotopes in foraminifera. This is a less robust record, still it indicates that CO_2 levels have remained below 500 ppmv for the last 24 million years. The lower panel represents CO_2 concentrations estimated by the model GEOCARB III, which is based



on a suite of inputs. The point of this illustration is that ecosystems of today evolved under relatively low CO_2 levels for at least 1/2 million years and probably for many millions of years.

This increase is unprecedented on human time-scales. "Present-day atmospheric burdens of these two important greenhouse gases [CO_2 CH_4) seem to have been unprecedented during the past 420,000 years" (Petit *et al.* 1999). Pearson & Palmer (2000) used boron-isotope ratios in forams to estimate pH of surface seawater, and reconstructed atmospheric CO_2 over the last 60 million years: "Since the early Miocene (about 24 my ago, atmospheric CO_2 concentrations appear to have remained below 500 ppm and were more stable than before, although transient intervals of CO_2 reduction may have occurred during periods of rapid cooling approximately 15 and 13 my ago."

It is certainly difficult to assert here that there is a relationship between past CO_2 levels and reef development (although some have proposed this in the past). However, this fact is interesting to note.

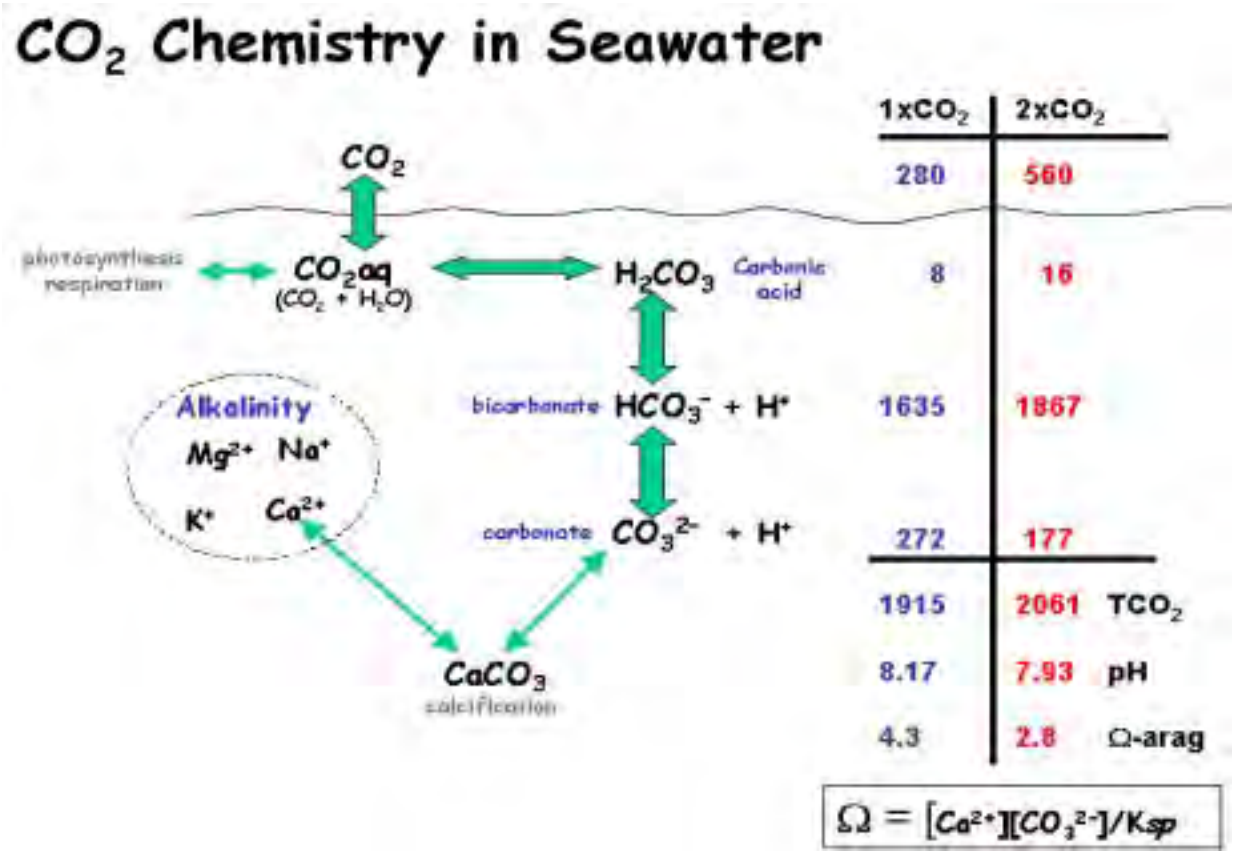
This diagram illustrates how increases in atmospheric CO_2 alter seawater chemistry.
As CO_2 is driven into the ocean, it quickly forms carbonic acid, which is a weak acid. Most of this rapidly dissociates to either HCO_3^- or CO_3^{2-}.

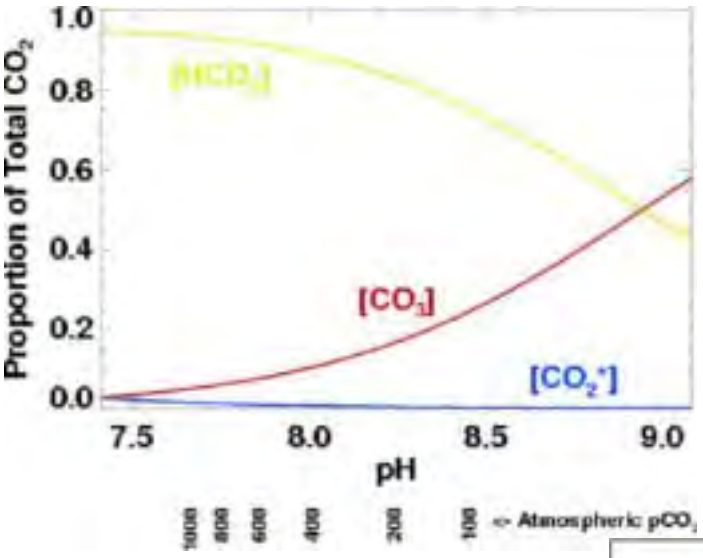
Alkalinity is the excess of positive ions in seawater.

This excess positive charge is balanced by the proportion of HCO_3^- to CO_3^{2-}. If more negative charge is needed, then some of the HCO_3^- is converted to CO_3^{2-}, and if less is needed, then some of the CO_3^{2-} is converted to HCO_3^-. As a first approximation, the carbonate ion concentration can be estimated as the alkalinity - total CO_2 concentration. In terms of how adding CO_2 changes the equation, one can easily see that by adding CO_2, the total CO_2 increases (note that this does not alter the alkalinity), and hence the carbonate ion concentration will go down. Also shown in this picture are the processes of photosynthesis/respiration and calcification. Photosynthesis/respiration alters the total CO_2 concentration, while calcification alters both the total CO_2 concentration and the alkalinity

This illustrates the kind of changes one might expect under double CO_2 conditions. Note that although the total CO_2 increases, the carbonate ion concentration goes down. Note also the decrease in aragonite saturation state. This calculation does not take into account any increase in temperature (this will be covered later)

The illustration at the top of the next page shows how the ratios of the various ions change in





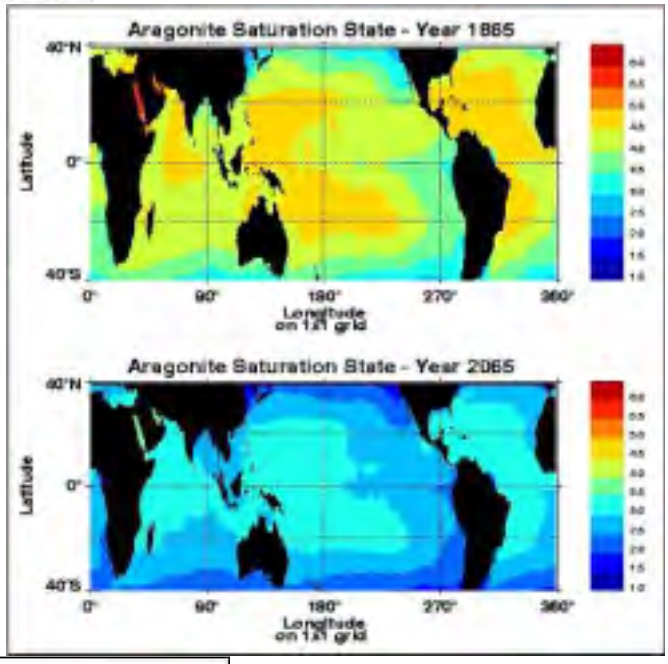
response to increases in atmospheric CO_2. As atmospheric CO_2 increases, more CO_2 is driven into seawater and pH is lowered. Also, the relative concentrations of carbonate and bicarbonate ions shift.

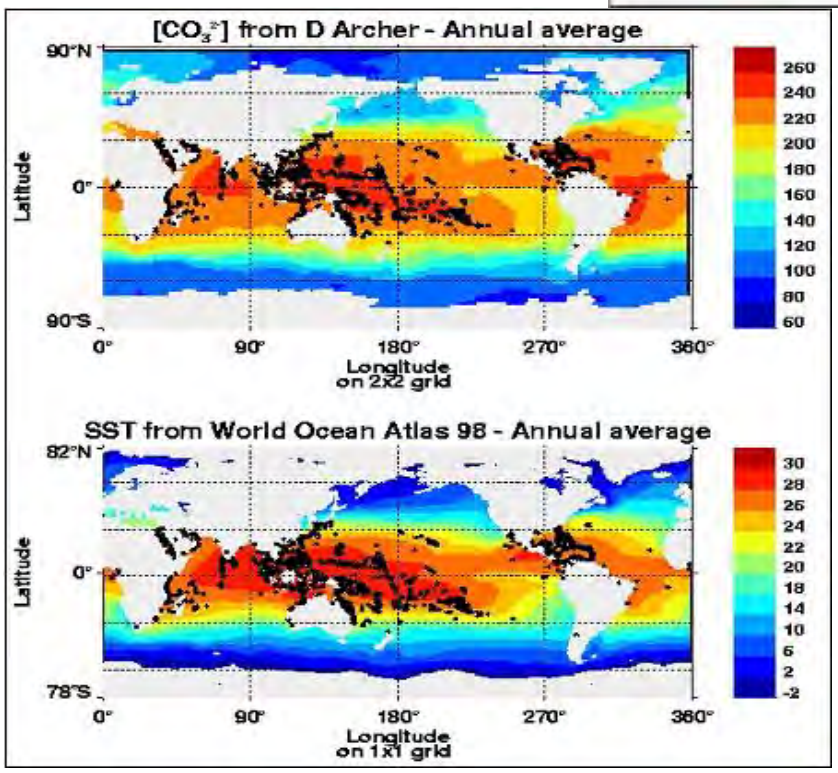
Temperature has an additional effect on carbonate equilibria. Warm water holds less CO_2 than cold water, and so the CO_3^{2-} concentration in warm waters is higher than it is in cold waters. So colder water has lower carbonate ion concentration than warmer water. The net effect is that a 2°C warming lessens the effect by about 10%

To stress the importance of temperature, two plots, one of saturation state (right) and the other

of sea surface temperature (SST) (below), are indeed remarkable similar. This confounds the issue of what controls the distribution of reefs (black dots on temperature map) - could aragonite saturation state have anything to do with where reefs occur?

By the middle of this century, we might be looking at a 20-30% reduction in calcification on reefs. Carbonate ion concentration is expected to decrease by about 30% as atmospheric CO_2 concentration doubles that of the pre-industrial. This takes into account both increases in CO_2 and 2°C warming





(assuming a uniform 2°C warming). Experiments performed by Chris Langdon and others demonstrate that calcification in corals and coralline algae is likely to decrease by about 15-30% over this same time period.

Hypothesis: reef $CaCO_3$ production will decrease by 15–30% under doubled pCO_2 conditions.

Supporting/refuting evidence:

- Aquarium/mesocosm experiments
- Coral cores - Lough & Barnes (1997) did not detect long-term decrease in calcifica-

tion in GBR *Porites* cores

- Current reef distribution (saturation state strongly correlated with temperature)
- Field evidence? (difficult to obtain)
  - Geologic record (corals existed during periods thought to have high pCO_2, but did not build reefs)
  - Distribution of inorganic $CaCO_3$ - marine cements/ooids.

Effects of doubled CO_2 on calcification

Organism/ System	*Manipulation*	*% Calc. Decrease*	*Reference*
Corallina	1	-44	Gao 1993
Porolithon	2	-25	Agegian 1985
Amphiroa	3	-36	Borowitzka 1981
Turbinaria	2	-15	Marubini *et al.* (in press)
Stylophora	2	-15	"
Goniastrea	2	-16	"
Acropora	2	-18	"
Porites	2	-18	"
	1	-19	Marubini *et al.* 2001
Acropora	2	-37	Schneider & Erez 2000
Porites	2	-27	Marubini & Atkinson 1999
Porites/*Montipora*	2	-51	Langdon & Atkinson (in prep)
Montipora	3	-22	Langdon (in press)
Gr. Bahama Banks*	4	-82	Broecker & Takahashi 1964 Broecker *et al.* 2001
B2 mesocosm*	1,3,4	-54	Langdon *et al.* 2000
Monaco mesocosm	1	-21	Leclercq *et al.* 2000

* dominated by coralline algae
Modified from: J. Kleypas, NCAR

The third column represents the percentage change in calcification rate by doubling the pre-industrial CO_2 concentration. Regardless of how the system is manipulated, all experiments have shown a decrease in calcification rate. The first thing to notice is that the algae (HMC) seem to show a stronger response to changes in carbonate chemistry. The corals tend to show a somewhat lower response

Hypothesis: dissolution of sedimentary $CaCO_3$, in response to increased pCO_2 and lowered pH, will adequately buffer water column chemistry

Evidence:

- Demonstrated (used) in marine aquaria. Flow of water through system enhances dissolution of carbonates and maintains equilibrium
- Over time-scales of deep ocean circulation, dissolution of deep-sea carbonates does buffer ocean system, although equilibrium would not be reached for 5000-6000 years (Archer *et al.* 1998)

Question: How rapidly can sediment dissolution buffer surrounding water column?

- effects of water residence time
- effects of sediment porosity, grain size, etc

Hypothesis: increasing pCO_2 in ocean will fertilize zooxanthellae, thus increasing coral growth rates

Reasoning:

- Zooxanthellae known to increase coral calcification/production ("super-corals" *sensu* Benson 1984)
- Anything that enhances zooxanthellae growth should also enhance calcification

Evidence:

- Zooxanthellae in corals use HCO_3^- rather than CO_2
- Increase in zooxanthellae growth does not necessarily enhance coral growth (e.g. increased nutrients enhances zooxanthellae growth and compete with corals for carbon - Marubini *et al.* 1999)

Future strategies

- Better determination of reef carbonate budgets
  - how much $CaCO_3$ corals precipitate
  - how much dissolves
  - how much exported, etc
- Better determination of light/temperature/ CO_3^{2-} controls on coral calcification
- Resolving coral biochemistry questions (ion transport mechanisms ?)
- Field experiments (e.g. need marine equivalent of terrestrial FACE program ?)

Table Factors in the Rise and Fall of Sea Level in the Twentieth Century (in centimeters)

	Best estimate	Possible range
Thermal expansion		
Surface water	+5	+1.5 to +7
Deep water	?	?
Melting of land ice		
Mountain glaciers	+3	+2 to +4.6
Antarctic ice	?	−10 to +13
Greenland ice	+2.5	+2.3 to +2.5
All factors	+10.5	−4 to +27
Observed sea level rise	+15	+12 to +20

Major question:
Increased sea level rise. Will coral growth keep up?

Other effects

Increasing Frequency of Hurricanes?
Greenhouse Effects?

Conclusions

- changes in ocean chemistry will significantly impact coral reefs.
- calcification will decrease in the future.
- there may be more bleaching events associated with global warming.

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British Indian Ocean Territory – the Fate of Small Coral Islands: trends of temperature and sea-level rise

Charles Sheppard, Friends of the Chagos & Warwick University

Sheppard, C. 2003. British Indian Ocean Territory – the Fate of Small Coral Islands: trends of temperature and sea-level rise. pp 244-246 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Four years after most corals died on the central Indian Ocean reefs of Chagos, the erosion of dead corals that followed has removed most branching forms and has eroded the surfaces of most others. Some reef surfaces just below low sea level have 'dropped' 1.5 m. Juvenile corals are abundant, though most settlement is occurring on eroding table corals or other unstable substrates, and are of less robust species.

Rising temperature will result in recurring mortality events, and the probability of this will increase very rapidly from about 2015. Sea levels are predicted to rise by 5-20 cm in this region by 2020. Erosion of some sections of rim, normally usually rising to only about 1-2 metres above high sea level, is already taking place.

It is concluded that at present erosion is 'winning' over new growth. Increased recruitment could reverse this, although only if no further mortality occurs caused by repeat warming episodes. Although the islands have high rainfall, their vegetation depends on the continued existence of their fresh water lenses, which will increasing become threatened as sea level rises and as rising temperature continues to kill the corals of these reefs.

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This focuses on the islands and reefs of British Indian Ocean Territory (Chagos), though it applies to most low coral islands in this region.

Four years after most corals died on the central Indian Ocean reefs of Chagos (Fig 1), erosion and recovery have been studied to 30 m depth. Mortality from the warming event was very high to 15 m deep in northern atolls, and was very high to >35 m deep in central and southern atolls; coral cover fell from an average of 50-70% to less than 5% in most places. Some lagoonal areas lost only half of their corals. The erosion of dead corals that followed has removed most branching forms and has eroded the surfaces of most others (Fig 2); bioerosion is high, and sandy and rubble chutes are visible, carrying volumes of

Figure 1. The seaward reef slopes in Chagos, before and after the 1998 warming.

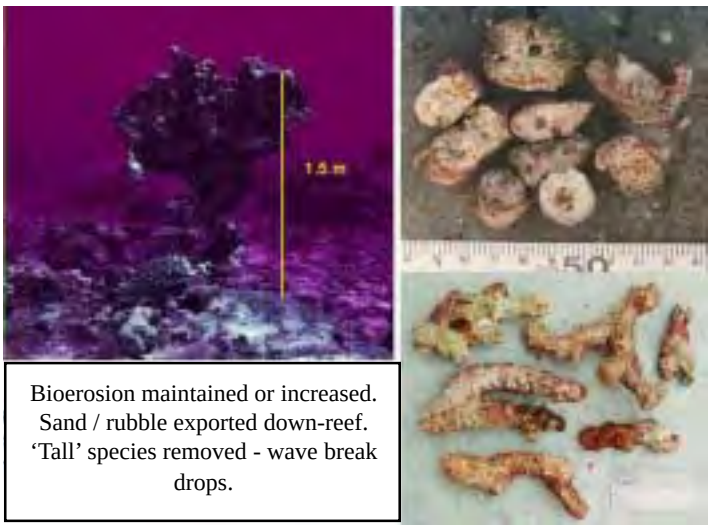

Figure 2. Erosion of the protective seaward corals. The 'stump' shows how tall these corals were (left). Right: erosion and 'hollowing out' of fragments of corals killed in 1998.

coral debris off the reef and into deep water. Some reef surfaces just below low sea level have 'dropped' 1.5 m due to the loss of their dense thickets of branching coral *Acropora palifera*.

The islands are protected from erosion by three main features: the seaward shallow corals, the algal ridge, and the broad shallow reef flat (Fig 3). Coral bioerosion is substantial, reducing 3-D reef 'structure' and making a habitat which is less conducive to maintaining a high biodiversity, and the unconsolidated rubble may provide a difficult place for coral settlement. Juvenile corals are abundant, though most settlement is occurring on eroding table corals or other unstable substrates, and are of less robust species.

New temperature (SST) data sets have blended historical and forecast temperatures, producing a series of monthly SST data from 1871 to 2099 (Fig 4). The critical SST in Chagos causing the mortality was 29.9°C, and mean SST has risen 0.65°C since 1950. Rising temperature will result in recurring mortality events, and the probability of this will increase very rapidly from about 2015 (Fig 5). Corals need about 5 years from settlement to reach reproductive age, and most grow very slowly, so with recurring mortality events from rising SST recovery is questionable and increasingly unlikely.

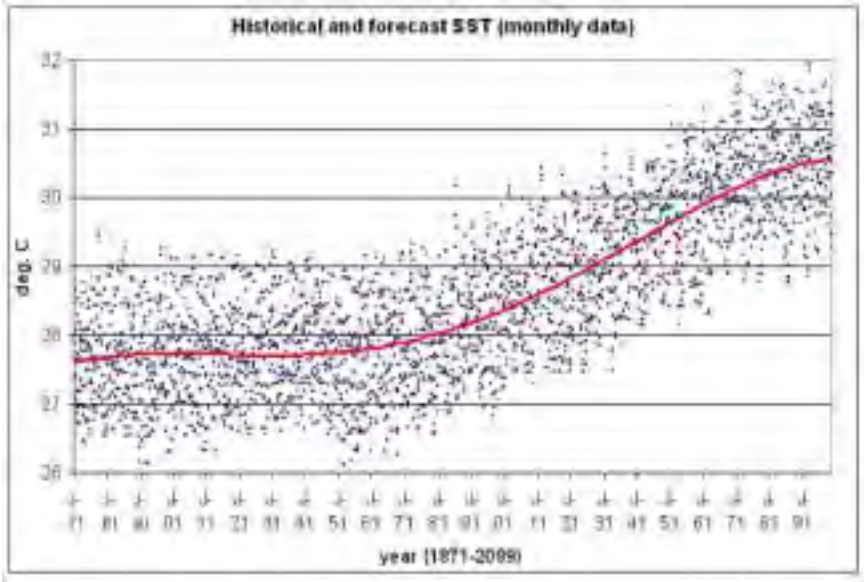

Figure 4. SST curve for Chagos from 1871 to 2099.

Figure 3. Aerial view of Salomon atoll showing the three wave-protecting 'protective barriers' to erosion: 1. Shallow, 'rough water' corals; 2. Reef crest; 3. Extensive reef flat at low water level.

Sea levels are predicted to rise by 5-20 cm in this region by 2020 (Fig 6). The short data set that exists shows that in the 1980s sea level rose

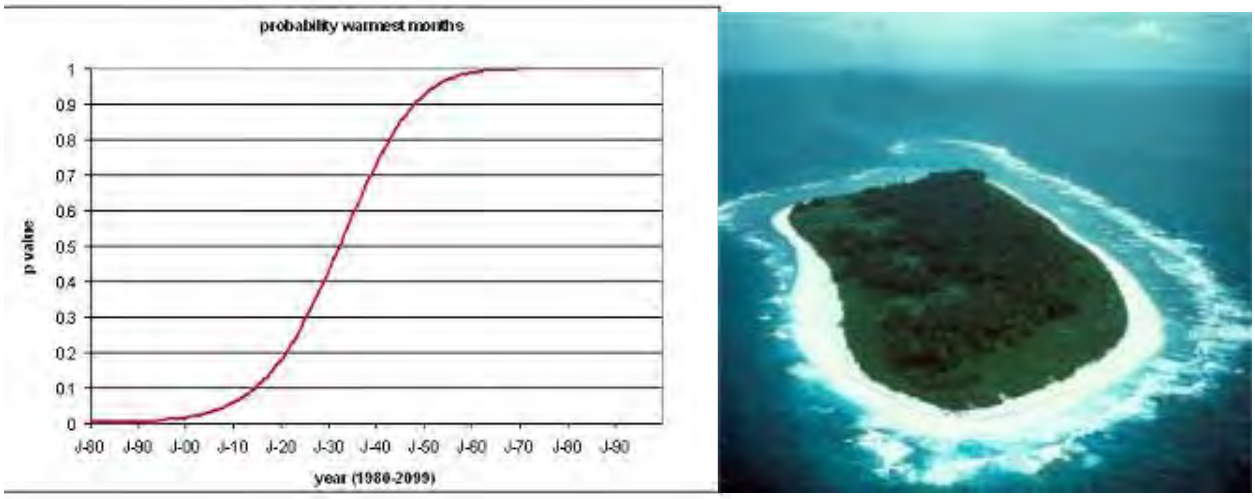

Figure 5. Probability of recurrence of a 1998 SST temperature in Chagos.

about 5.5 mm per year. Although this is a short series, it matches closely those of adjacent areas, such as the Maldives.

Profiles across several coral islands shows that most islands have a depression in their middle, which dips to present sea level or below. A higher 'rim' surrounds most, and this rim extends usually to about 1-2 metres above high sea level (Fig 7). Erosion of some sections of rim is already taking place.

It is concluded that at present erosion is 'winning' over new growth. Increased recruitment could reverse this, although only if no further mortality occurs caused by repeat warming episodes. Given the general 'Brunn rule' for sandy beaches (which says that horizontal erosion proceeds at about 150 times the vertical rise in sea level), at least 1 metre of horizontal beach erosion may be lost to erosion each year. As sea level rises, the possibility of sea water intrusion, and of island rim breaching, are clearly significant. Although the islands have high rainfall, their vegetation depends on the continued existence of their fresh water lenses, which will increasing become threatened as sea level rises and as rising SST continues to kill the corals of these reefs.

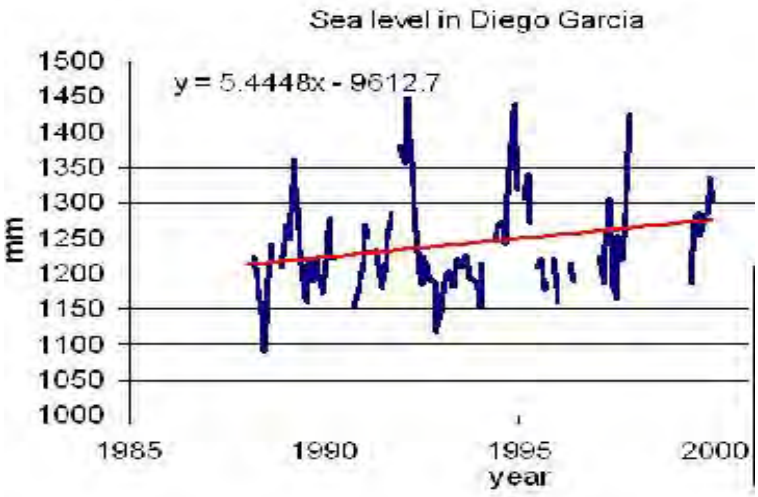

Figure 6. Sea level trace for the Chagos archipelago.

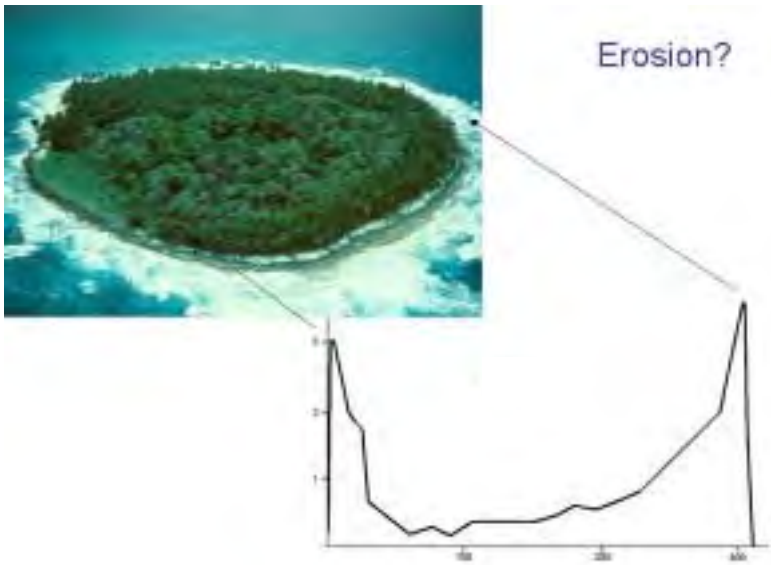

Figure 7. Profile across one island (North Brother, Great Chagos Bank) with photo of the island.

Implications of global warming and sea-level rise for coastal nesting birds in Bermuda

David B Wingate and Patrick Talbot

Wingate, D.B. & Talbot, P. 2003. Implications of global warming and sea-level rise for coastal nesting birds in Bermuda. pp 247-256 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Evidence from tide gauge and tectonic measurements world wide suggests that absolute sea level rose by approximately 20cm during the 20th century, but the rate of rise is accelerating and may attain 5mm/yr in the 21st century. This may be the highest rate recorded since the advent of human civilization. Bermuda has long been recognized as a tectonically stable platform and has been used as a benchmark for measuring glacial eustasy. Our own tide gauge measurements since 1930 support the global estimate.

This paper summarizes 50 years of subjective observations by the senior author on the effect of this sea level rise on mangrove, beach/dune and rocky coastal habitats and reviews additional objective research on mangroves. It also provides objective data on the impact of this rise on three species of seabirds which nest in the rocky coastal habitat - the habitat that comprises > 90% of Bermuda's coastline.

Two of the three species, the Bermuda petrel (Cahow) *Pterodroma cahow* and the white tailed tropicbird (Longtail*) Phaethon lepturus catesbyi* have suffered very significant effects, mostly within the last decade, and because both are highly philopatric, they are unlikely to relocate their breeding sites in time to avoid further harm.

The slowly increasing Cahow, is presently restricted to 4 tiny islets totalling < 1 ha. which are protected only partly from the open ocean by Bermuda's unique south shore boiler reefs. Between 1951 and 1995 the worst damage caused by storm waves or hurricane storm surge never affected more than two nesting sites at a time. Then in 1995 and again in 1999 storm surge from two major near-miss hurricanes completely over-washed two of the islets and caused severe erosion and cliff falls on the other two, trashing 40% of the nest-sites on both occasions The Cahow recovery team barely had time to repair the damage before the birds returned for their winter nesting season. Clearly, a direct hit category 3 or a late season hurricane at the beginning of the winter nesting season could be catastrophic. This rapidly growing threat results not only from sea level rise, but also from the predicted increase in frequency and severity of storms with global warming.

The tropicbird is Bermuda's most common coastally nesting seabird, with a breeding population estimated between 1500-2000 nesting pairs. Data from a survey of >200 marked nest sites in the Castle harbour island nature reserve, monitored by Wingate from 1973-1980 and resurveyed by Talbot beginning in 2001, has provided the greatest insight into the process and scale of nest site destruction/ creation, and the relative contribution of sea level rise, normal weathering and catastrophe events to this process.

From a global perspective, the threat to coastal nesting birds from sea level rise results indirectly from the sheer scale of anthropogenic development in coastal areas and our inevitable tendency to try and defend that development against sea level rise by the construction of coastal defences such as seawalls, sand replacement and landfill, rather than dismantling and retreating. By interposing our built environment and trying to hold the line against the natural landward pro-gradation of coastal

habitats that would otherwise occur, we are ultimately dooming both. This problem is already apparent along Bermuda's main island coastline where significant anthropogenic development has already occurred. In our attempts to defend this development from erosional encroachment, an increasing number of property owners are applying for planning permission to build concrete seawalls and other defences, which inevitably destroy the natural erosion cavities and cliff talus in which tropicbirds nest, not to mention the effects on the aesthetic beauty of our coastline. The Tropicbirds' nesting options are becoming increasingly constrained from above by human development and from below by sea level rise.

The only near-term option for helping both the Cahow and the Tropicbird has been to design and build *artificial* nesting cavities on the highest points of the islets and cliff tops in a manner that is safe both from sea-flooding and mammal predators. A longer-term project is being undertaken to attract the Cahow to nest on the much larger and higher predator-free Nonsuch Island.

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Introduction: The Case For Global Sea-Level Rise

Data from tide gauges, satellite altimetry and measurements of tectonic uplift and subsidence taken worldwide suggest that, after a long period of near stasis in the late Holocene, global sea-level rise began accelerating again in the 19th century and rose by approximately 20 cm during the 20th century. The rate of rise is expected to at least double again during the 21st century. The most recent estimates from climate modelling range from 19 to 71cm with a central value of 49cm (Sterr 1998). This would be the highest sustained rate of rise since the advent of human civilization and, whether or not the cause is primarily anthropogenic as most scientists now believe, it will have profound implications for both wildlife and human populations that live on our coastlines.

Bermuda is one of the smallest and most remote oceanic islands in the world, located at 32°45'N and 64°17'W and with a land area of 57 km^2. It has long been recognized as a tectonically stable benchmark for measuring glacial eustasy as recorded in its Pleistocene carbonate sediments (Vacher & Hearty 1989). Bermuda's tide gauge measurements, recorded since 1932 (Barnett 1984, Pirazzoli 1986) are not surprisingly, therefore, consistent with the global estimate of sea-level rise.

Due to the even more rapid sea-level rise of the early Holocene, >4000 years ago, most of Bermuda's coastline is already erosional, comprised mainly of sea-cliffed aeolianite dunes of marine carbonate sediment in various stages of cementation and diagenesis. Coastal cliffs, or low rocky shores and islets, presently make up 93% of the coastline, beaches comprise approximately 6% and mangroves only about 1%.

This paper summarizes fifty years of subjective observations by the senior author on the effect of the recent accelerating sea-level rise on Bermuda's mangrove, beach/dune and rocky coastal habitats and reviews additional objective research on mangroves. It also provides specific information on the impact of this rise on three species of coastally nesting seabirds, all of which nest in the rocky coastal habitat.

Effects of Sea-Level Rise on Bermuda's Coastal Habitats

1) Mangrove Habitat

In a classic study of the effect of sea-level rise on the rate of formation or destruction of mangroves,

carried out at Hungry Bay mangrove swamp, Bermuda (Ellison 1993), it was demonstrated that "low island" mangroves, i.e. those without any input of estuarine sediment, build at a rate of only 7-9 cm per 100 years and that any sea-level rise in excess of this rate results in erosion and destruction.

Ellison measured and dated the mangrove peat profiles of Hungry Bay in relation to ordinance datum (mean present day sea-level). Mangrove peat forms between mean sea-level and high water mark and has been shown to be a definitive sea-level indicator (Ellison 1989). Hence the dated stratigraphy in Hungry Bay provides several points for sea-level reconstruction.

Her data show that sea-level was rising at 25cm/100yr before 4000BP, 6cm/100yr between 4000BP and 1200BP and up again to 14.3cm/100yr between 1200BP and the present. As the rate of mangrove peat formation only exceeded sea-level rise in the period between 4000BP and 1200BP the mangrove swamp has probably been retreating for the last 1200 years. The stratigraphy near the mouth of the swamp not only confirms this, but provides an actual measure of the loss, which is 2.24 acres, nearly one quarter of the original area of 8.5 acres. Moreover, there has been direct visual confirmation of this process occurring at an accelerating rate over the past four decades.

The situation with continental mangrove swamps, or their salt marsh equivalent, where estuarine sediment input permits a more rapid build up of peat (up to 18.8cm/100yr) is somewhat better, but nevertheless now below the present rate of sea-level rise. As the land gradients in these two habitats are extremely shallow, just a few centimetres of sea-level rise can result in many metres of landward erosion and inundation following the Bruun rule (Bruun 1962), which states that increased wave erosion with higher sea-level removes sediment from shore faces in the upper part of the tide range and re-deposits it in the lower part, typically resulting in low cliffing of the peat along the seaward margin of mangroves or salt marshes.

There have already been huge losses of marshland important to nesting and wintering water birds in Louisiana from this process (Gosselink & Baumann 1980, Childers & Day 1990). Bermuda's mangroves are very diminutive, however, and do not in any case provide exclusive nesting or feeding habitat for any locally breeding species.

2) Beach/Dune Habitat

Bermuda's beach/dune habitat is more extensive than the mangrove habitat, primarily because the source material - carbonate sediments derived from the growth, respiration and decomposition of shallow water coral-reef and sea-grass communities and from re-cycled rubble and sand from coastal cliff erosion - has a much higher, and larger scale, depositional rate than mangrove peat in the tropical marine environment.

Although some sediment is lost through down-slope erosion off the edge of the Bermuda platform in storms and hurricanes, the generally high rate of sediment generation probably accounts for the fact that long-shore current derived beaches often front coastlines that are otherwise erosional, being backed by cliffs rather than beach dunes.

A high proportion of Bermuda's South Shore beaches are of this type and regularly wash away temporarily when major storms or hurricanes re-assert the long term erosional trend. As with mangrove swamps and salt marshes, erosion of beaches with sea-level rise follows the Bruun rule of landward pro-gradation, hence those beaches presently backed by cliffs will ultimately be lost.

This is not a good scenario for an island whose economy depends largely on tourism! Although beaches elsewhere are important as nesting habitat for certain shorebirds and terns, there are no present day beach nesting species in Bermuda.

3) Rocky Coastal Habitat

As indicated in the introduction, the rocky coastal habitat makes up more than 90% of Bermuda's coastline. Its ruggedly beautiful aspect is shaped by two fundamentally different erosional processes.

One is on-going and almost imperceptably subtle and slow in its effect and includes wind abrasion, freshwater solution and bio-erosion under the general heading of "weathering". (The dark grey surface colour that develops on our otherwise white aeolianite is caused by a blue-green algae (cyanobacteria) that colonizes the surface.)

The other process is stochastic but catastrophic in scale and caused entirely by hurricane waves. Fifty years of personal observation has convinced the senior author that the macro features of our coastline - those jagged ledges, stacks and gullies and huge blocks of fallen cliff and rock talus - have been shaped by major catastrophe events occurring at rare intervals on the order of a century, or even several centuries apart. Weathering provides only an aesthetic veneer to those features.

Effects of Sea-Level Rise on the Coastal Nesting Seabirds

Common tern

The common tern *Sterna hirundo* with a current breeding population of only 25 pairs, (Wingate, unpublished data) nests only on small rocky islets

located within Bermuda's larger enclosed sounds and harbours where their sheltered location from ocean waves makes them safe from all but hurricanes. Interestingly, a unique bio-erosional notch threatens to topple a few of the smallest islets in Harrington Sound, but if sea-level rise accelerates as predicted, these and some others will be submerged during the 21st century. This need not necessarily be a problem for this non-philopatric species, which can readily move to new locations. However, because the Bermuda tern population tends to nest territorially, one pair per islet, the population might decline further if the number of nesting islets declines.

Bermuda petrel or Cahow

Of far greater concern is the endangered endemic Bermuda petrel or Cahow *Pterodroma cahow.* Precolonially this then super abundant seabird was an inland nester, excavating its burrows in soil under the forest. However, introduced mammal predators and human harvesting for food rapidly reduced it to the verge of extinction (Lefroy 1877). At the

time of its rediscovery in 1951 (Murphy & Mowbray 1951), it survived only on a few tiny predator-free off-shore islets totalling less than one hectare in area and comprised exclusively of rocky

coastal habitat. Lacking soil for burrowing, the Cahow was forced to occupy erosional crevices in the coastal cliffs where it came into nest-site competition with the much more common White-tailed Tropicbird (Wingate 1978). Despite these limitations, an intensive conservation effort employing defences against tropicbirds and the

construction of artificial burrows has enabled it to increase from 18 pairs in 1961 (when the *entire* breeding population first began to be monitored), to 65 pairs in 2003 (Wingate 1985 and unpublished data).

The Cahow's nesting islets at the mouth of Castle Harbour are protected only marginally from the

open ocean by Bermuda's unique algal-vermetid "boiler" reefs (Ginsberg & Schroeder 1973).

Consequently they are extremely vulnerable to over-wash and wave erosion in major storms and

hurricanes. Between their rediscovery in 1951 and 1989, however, the worst damage experienced never affected more than two nesting sites at a time. Hurricanes Dean and Gabrielle in 1989

caused damage to six of the nest sites. Then in 1995 and again in 1999, storm surge and ground swell from two major near-miss hurricanes, Felix and Gert, completely over-washed two of the islets and caused major erosional damage to two others, trashing 40% of the nest sites on both occasions! The Cahow recovery team barely had time to repair the damage before the birds returned for their winter nesting season (Wingate 1995). These were category 2 and 3 hurricanes, which missed Bermuda by 40 miles and 125 miles respectively. Quite clearly a direct hit category 3 or 4, or a late season hurricane overlapping the beginning of the nesting season in late October or November, could be catastrophic. This rapidly growing problem results not only from sea-level rise but also from the predicted increase in the frequency and intensity of storms with global warming.

The Cahow is a very long-lived species with some breeding pairs occupying nest sites for 15 to 20 years before mortality disrupts them. They are also highly philopatric, with new pairs establishing closely adjacent to the pre-established pairs. Thus all of the population increase so far has been confined to the relic breeding islets. There is an urgent need to attract new pairs of Cahows to nest on larger and higher predator-free islands and the Nonsuch "Living Museum" nature reserve was established in 1961 with this ultimate goal in mind (Wingate 1978, B. Cartwright, L. Nash and D. B. Wingate 2001). Techniques have already been developed elsewhere for attracting petrels to new islands (Bell 1996, Podolsky & Kress 1989) and we hope to begin implementing these for the Cahow as soon as possible.

White-tailed tropicbird or "Longtail"

The White-tailed tropicbird or "Longtail" *Phaethon lepturus catesbyi* is the only pre-colonial nesting seabird of Bermuda which has survived in substantial numbers, owing primarily to its obligate cliff hole nesting niche which makes most of the nest sites inaccessible to the introduced mammal predators (Gross 1912). Like the Cahow,

it is a long-lived and highly philopatric species with some breeding pairs occupying nest sites for ten or more years before mortality disrupts them. An estimated 2000 breeding pairs still breed along most of the main island coastline and adjacent islets, but they are declining gradually for a number of anthropogenic reasons apart from the effects of sea-level rise. These include dog, cat, rat and American crow predation; competition from cliff nesting feral pigeons; coastal development by man; and blockage of nest sites by dumped vegetation and trash, or overgrowth by invasive alien plants (Wingate unpublished data).

The Castle Harbour national park islands are free of the foregoing problems but subject, like the Cahow islets, to ocean swells. This paper reviews data from a 200+ nest site study there; this was carried out by Wingate from 1970 to 1983, and revisited 20 years later by Talbot, beginning in 2001.

As the emphasis of this survey was on nest site parameters and breeding success, rather than biometrics, and tropicbirds tend to be more sensitive to human disturbance than Cahows or terns, the methodology was designed to be as non-invasive as possible. Birds were not handled or ringed and nests were checked only in late afternoon or at night when the birds were less active or sleeping.

As incubation lasts 43 days and fledging approximately 60, once monthly checks were determined to be adequate for confirming success or failure in more than 95% of cases. Birds remaining on nests overnight were assumed to be brooding an egg or chick even if the latter were not visible (chicks are brooded for about 20 days). The final nest check was timed to be as close to fledging stage as possible. Nest failures were usually confirmable by the presence of broken eggshell or a dead chick or by their disappearance well before hatching or fledging time. Nests which still contained healthy looking chicks close to fledging age were assumed to be successful if vacant on a subsequent check.

This survey has so far provided the clearest insight into the process, and scale, of nest-site destruction and creation resulting from normal weathering, catastrophe events, and sea-level rise, respectively.

Tropicbirds are able to play only a minor role in the excavation of nest sites because they nest primarily in a rocky environment. The basic requirements for a viable tropicbird nest site are: a sandy or soily substrate (they do not use nest material); protection from direct sunlight, at least in the hotter hours of the day; and shelter from the rain. Four types of cavities provide these conditions:

1. Eroded pocket holes in cliffs, generally formed where un-cemented sand replaced decomposed tree stems, roots or branches following burial by a dune in the younger aeolianites, but also formed by solution pipes and caves in the older and more modified aeolianites.

2. Deep erosional crevices where certain dune strata or accretionary soils have a lesser degree of cementation.

3. Cliff-fall rock talus, which provides natural cavities between rock slabs that gradually accumulate enough sand in them to become useable.

4. Sandy areas under dense vegetation. This last type of nest site is now very rare on Bermuda, and no longer viable on the main islands, because of greater exposure to rain and predators.

Our surveys revealed that weathering plays the major role in nest-site creation, with new nest-sites being created only gradually by differential erosion of the cliff faces and accumulation of sand or soil

in the cliff holes or under cliff-fall talus. Hurricane catastrophe events, on the other hand, play the major role in nest site destruction by causing cliff falls and re-working cliff-base talus, or by washing sand and soil out of the nesting crevices and back-filling or blocking them with rocks. These events are stochastic, resulting in immediate episodic losses of nest sites, which then requires many years or decades of normal weathering before new ones are created.

In the long term, rising sea-level should not cause an overall reduction of nest-sites except on the low relief islets where there are no higher options to escape sea flooding. On Bermuda's mainland, however, where interposing anthropogenic development along the coastline constrains the ability of the tropicbirds to find safe new nest sites higher up on the cliffs, this has become a major cause of decline. An effort is now being made to mitigate this problem by developing specifications and designs for mass producible artificial nest sites safe from mammal predators, and requiring that they be included in any planning approval for coastal development

(Wingate 1988, Dobson 2002). There is an extraordinary opportunity here because tropicbirds have no aversion to nesting in close proximity to people; require only 0.5 cubic metre of nest cavity on land; and always land and depart directly from that nest cavity.

The approximately 25-year hiatus between the mid-point of our two tropicbird surveys has additionally provided a sobering indication of the scale of nest site disruption and breeding failure that has resulted from accelerating sea-level rise and increased intensity of storms (Table 1).

Over this quarter century period, an extraordinary 90 (45.7%) of the 197 nests in the original survey were destroyed, mainly by the hurricane events of 1995 and 1999. While 50 (24.5%) new natural nest sites out of 204 nests have gradually been created and colonized since the original survey, the

Table 1 Comparison of breeding success* in a predator-free population of white-tailed tropicbirds *Phaethon lepturus* nesting on the Castle Harbour Islands Nature Reserve, Bermuda, monitored from 1970 to 1983 and again in 2001-2002.
* % breeding success is defined here as the percentage of nests regularly visited by adults that fledged a chick, whether or not an egg was confirmed.

Original Survey (All natural nests)

Year	Occupied Nests	Fledglings	% Success
1970	118	87	73.7
1971	129	64	49.6
1972	128	90	70.3
1973	143	89	62.2
1974	166	121	72.9
1975	168	103	61.3
1976	169	121	71.6
1977	178	125	70.2
1978	179	119	66.5
1979	197	139	70.6
1980	191	134	70.2
1981	171	103	60.2
1982	No survey conducted		
1983	192	127	66.1
		Mean	66.6

Repeat Survey (Natural nests only *)

2001	132	63	47.7
2002	130	65	50.0
		Mean	48.8

* The repeat survey includes a number of man-made or radically repaired natural nests which would not otherwise have existed or been useable following hurricane destruction. These have deliberately been excluded from this table in order to compare results as they would have been without human intervention.

majority are still so marginal that they are experiencing very low breeding success due mainly to crow predation and exposure to sun and rain.

This, plus increased short-term competition for the reduced number of optimal nests (which often results in vicious fights to the death), has lowered the breeding success in occupied natural nest sites from 66.6% in 1970-83 to 48.8% in 2001-2. This comparison is preliminary, of course, and may not be as statistically significant in the longer run, because the repeat survey has been under way for only two years, and one of the ten years of the original survey *did* have a breeding success rate that matches the current mean of the repeat survey.

It is worth mentioning here that the repeat survey additionally includes a number of man-made nest-sites that were rebuilt after the hurricanes or added to the survey islands after the initial survey. These were deliberately excluded from the foregoing breeding success comparison because they would not otherwise have existed. However, if we consider what percentage of the new survey they represent, particularly in regard to breeding success (Table 2), it becomes possible to get some idea of how many additional man-made nests might have to be provided in order to restore the breeding success to the level of the original survey.

Table 2 The results of the 2001-2002 survey with the data from the additional man-made nests included.

Year	Occupied Nests	Fledglings	%Success
2001	149	75	50.3
2002	155	79	51.0
		Mean	50.7

Conclusions

The evidence provided from these studies on Bermuda suggests that, on the global scale, we can expect an increasing trend towards erosional coastlines, resulting in an increasing proportion of rocky or cliffed coastlines and a proportionate loss of mangrove, salt marsh and beach/dune habitat. Provided that there is space for these habitats to pro-grade naturally inland, however, they can keep pace with sea-level rise to a varying degree.

The main problem arises from the sheer scale of anthropogenic development along coastlines and our obvious reluctance to abandon this built environment in the face of sea-level rise. In our efforts to protect, rather than abandon and retreat, we construct coastal defences such as sea-walls, sand-replacement and landfill and thus either destroy or block the natural landward pro-gradation of the coastal habitats. Taking a longer-term view, this approach can result only in the destruction of both the habitats and the species that breed or feed in them. Ultimately, of course, our built environment becomes doomed as well, when the rising costs of defending it can no longer be justified economically.

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Topic 6: Dealing with invasive species: sharing knowledge and experience

Workshop co-ordinated by: Oliver D. Cheesman, CABI Bioscience; Colin Clubbe, Royal Botanic Gardens, Kew; Anne F. Glasspool, Bermuda Zoological Society; and Karen Varnham

Cheesman, O., Clubbe, C., Glasspool, A. & Varnham, K. 2003. Dealing with invasive species: sharing knowledge and experience. pp 257-272 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Invasive species are now widely regarded as the second most important threat to biodiversity, after habitat destruction. The impacts of invasive species are particularly severe on small island ecosystems. This paper briefly reviews the importance of such ecosystems and the threats that they face from invasive species. Some resources available internationally to help in the battle against invasive species (particularly on small islands) are listed, and the outputs of a panel-guided discussion are provided in table form. These draw on the knowledge and experience of conference delegates, under three broad headings: awareness raising, prevention strategies, and control measures.
[Note that some papers relating to this topic occur also earlier in these Proceedings.]

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Workshop in session, led by (L to R): Oliver Cheesman, Annie Glasspool, Karen Varnham and Colin Clubbe (BP)

The importance of island ecosystems

Island ecosystems display many special characteristics (e.g. see Carlquist 1974; Williamson 1981; Whittaker 1998). Many of these result from the relative isolation of islands from other landmasses, and the difficulties that animals and plants experience in dispersing naturally across the sea. Consequently, islands provide remarkable opportunities to study fundamental ecological concepts and processes, including the general rules of biogeography (MacArthur & Wilson 1967), assembly rules for biological communities (e.g. Diamond 1975; Diamond & Gilpin 1982; Gilpin & Diamond 1982) and primary succession (e.g. on Krakatao following volcanic activity there: Whittaker & Bush 1993; Whittaker 1998). Islands can provide also situations in which to study the concepts of minimum viable populations (e.g. Soulé 1987), metapopulation theory (e.g. Levins 1969; Gotelli 1991; Hanski 1996), and the processes of speciation and evolution - it is no coincidence that Charles Darwin and Alfred Russell Wallace both developed their pioneering theories of natural selection based on observations made largely of island communities (Darwin 1859; Wallace 1902).

Island ecosystems tend also to be rich centres of biodiversity. Although they tend to support fewer species per unit area than continental landmasses (Whittaker 1998), islands are often home to disproportionate numbers of endemic taxa. Some of these provide peculiar examples of the evolutionary results of living in great isolation, and/or as part of an ecosystem with relatively few other species. Dispersal ability may be lost, resulting in flightlessness, as seen amongst the birds of New Zealand (e.g. Holdaway 1990), or the endemic beetle fauna of Tristan da Cunha (Elton 1958; Williamson 1981). Nanism or gigantism may occur, producing unusually small- or large-bodied species, respectively. The islands of the Caribbean support the world's smallest species of bird, lizard and snake, but they previously also supported giant tortoises (Case *et al.* 1992), similar to those found on the Galapagos and Aldabra. Spectacular adaptive radiations may occur on islands, resulting in unique suites of closely related but differentially adapted species. Hawaii provides a number of well-cited examples. Here, a single colonist species appears to have given rise to three genera and 54 species of tree crickets (Oecanthinae), representing nearly half of the world's known species (Otte 1989), and drosophilid fruit flies have shown an even greater degree of adaptive radiation, with one or two founder species giving rise to 700-1000 separate species, again accounting for nearly half of the known world fauna (Whittaker 1998).

The island biodiversity crisis

For all of the reasons outlined above, island ecosystems are of enormous conservation value. However, island biodiversity is particularly threatened by the damaging effects of human activities. Available data suggest that a disproportionate number of post-1600 extinctions have involved the loss of island species (Groombridge 1992). Amongst well-researched taxa (mammals, birds and land snails), around 80% of extinctions in this period may have been of island species. There is sub-fossil evidence that human impacts also caused significant extinction of vertebrate island species prior to 1600 (Whittaker 1998). Globally, Case *et al.* (1992) conclude that human activities have raised reptilian extinction rates by an order of magnitude on small islands, and Steadman (1997) estimates that island bird extinction rates increased by some two orders of magnitude as a consequence of human colonisation.

A range of human activities on islands have resulted in rapid species extinctions, notably: direct removal of individuals (hunting, timber extraction, etc.); habitat destruction; and introduction of non-native species (including disease agents). On many islands, introduction of invasive alien species can be regarded as the most important factor in the elimination of indigenous biodiversity, although the above mechanisms often act in combination (Whittaker 1998). Consequently, there is particular interest amongst conservationists in the impacts and management of invasive species on oceanic islands (e.g. Vitousek 1988; Veitch & Clout 2002). It is worth noting that these are not new concerns. Charles Elton devoted a chapter of his seminal 1958 publication *The Ecology of Invasions by Animals and Plants* to remote islands, noting (amongst other things): that New Zealand and Hawaii were particularly affected; that the introduction of rats and grazing animals were particularly damaging to indigenous island biodiversity; that invasive species indirectly (as well as directly) cause extinction of island species; and that some introduced species fail to establish outside human settlements, whilst others spread rapidly through a range of habitats.

Island ecosystems and invasive species

Invasive species and their environmental impacts have attracted much concern in recent years. The Convention on Biological Diversity (CBD) calls for action against invasive species in its Article 8h, and the IUCN (2000) describes their effects on indigenous biodiversity as "immense, insidious and usually irreversible". A number of sources consider in detail the environmental impacts of invasive species (e.g. Vitousek *et al.* 1997; Chapin *et al.* 2000; Mack *et al.* 2000). Globally, invasive species are widely-cited as the second greatest threat to biodiversity after habitat destruction, although figures have been produced which indicate that they represent the *greatest* threat. Hernendez *et al.* (2002) suggest that invasive species are responsible for 39% of all species extinctions since 1600, whilst habitat destruction accounts for 36%. However, as noted above, human-induced extinctions often occur as a consequence of a combination of factors. As well as environmental damage, the huge scale of the economic impacts of species invasions are increasingly recognised (e.g. see Pimentel *et al.* 2000).

Invasive species impacts on indigenous biodiversity can be particularly severe on islands. The introduction of species compromises the all-important isolation of island biotas, the very characteristic that underpins their special patterns of development. Hernendez *et al.* (2002) estimate that 12% of all continental animals (20% of mammals, 5% of birds, 15% of reptiles and 3.3% of amphibians) are threatened by alien invasions. However, the rates of threat increase on islands: 31% of animals (11% of mammals, 38% of birds, 32% of reptiles and 30% of amphibians). Unfortunately, many of the biological characteristics that make islands so special, and of such substantial conservation value, also render them particularly vulnerable to the establishment and impact of invasive species (e.g. see D'Antonio & Dudley 1995; Cronk & Fuller 1995). Such characteristics include the relative paucity of indigenous species (providing for greater vacant niche space and less competition than would be found on the mainland), the small size of island populations (rendering them more prone to extinction), and their evolution in isolation (leading, for example, to loss of defensive behaviours and consequent vulnerability to introduced predators). Other factors that have been cited as increasing the impact of species invasions on islands include the release from natural enemies experienced by introduced species (which often arrive without the predators and competitors that regulate their numbers in continental populations), and patterns of human exploitation of islands (many New World islands were colonised by Europeans before the continental mainland, were important trade centres with substantial international traffic in commodities, and have acquired very high density human populations).

The problem of invasive species impacts on island ecosystems is exacerbated by the fact that a single non-native species can drive numerous indigenous species to extinction, as witnessed by the effects of introduction of the Brown Tree Snake *Boiga irregularis* to Guam, or the invasive shrub *Miconia calvescens* to Tahiti (Whittaker 1998), for example. Such multiple extinctions can result from direct impacts on similar species (e.g. goats overgrazing a range of native plants), or a combination of direct and indirect effects (e.g. the elimination of insect pollinators by an invasive species, leading to plant extinctions, or elimination of plants leading to loss of specialised herbivores).

Coblentz (1998) summarises the impact that an introduced herbivorous mammal, such as the goat or rabbit, can have on an island ecosystem. The initial impact is generally severe over-grazing of local plants, particularly the more palatable species. Over-grazing creates patches of bare ground, which may allow enhanced germination of less palatable plants (which can come to dominate the plant community), or may remain barren. Small populations of plants may survive in inaccessible areas, but these can gradually exhaust their seed supply (as any seed that is dispersed into accessible sites results in seedlings that are quickly eliminated). The death of these relict populations can represent the extinction of the species, and with it any other species (such as insects) that have evolved to depend upon it. The general depletion of the plant community results in loss of habitat for a range of animal species (birds, reptiles, insects), which may also face extinction. The process also exposes soils, promoting erosion (and extinction of the soil biota), and a once vigorous, diverse ecosystem can be replaced by a barren landscape. Omnivorous species, such as pigs, can have all of the impacts of a large introduced herbivore, plus the direct negative effects of feeding on invertebrates and vulnerable stages of vertebrates.

As Coblentz (1998) notes, feral cats and rats on islands are primarily a threat as predators of sea birds and endemic reptiles, and can displace or

extirpate such species very rapidly. It has been suggested that global seabird numbers have been reduced by tens of millions due to predation by rats and cats (Coblentz 1998). Veitch (1998) estimates that 30 of 55 seabird species studied on Pacific islands cannot survive in the presence of rats, which also imperil almost all terrestrial insects larger than 10mm, many reptiles and even certain tree species. Case *et al.* (1992) conclude that introduced predators (dogs, cats, rats, mongooses) have been the main agents of extinction of reptiles on small islands, and that large-bodied reptiles with a long history of island isolation have proved most vulnerable. On the island of Pine Cay (Turks & Caicos Islands), rock iguanas were driven to extinction in just six years by feral cats that originated from pets introduced by resort construction workers (Coblentz 1998).

The process of deliberate or accidental introduction of exotic species to islands involves the same (numerous and diverse) mechanisms that lead to movement of non-native organisms within and between continents. Examples of important pathways (e.g. see Wittenberg & Cock 2001), include:

Deliberate
Plants introduced for agriculture/forestry
Animals introduced as livestock or for sport
Ornamental plants
Other "aesthetic" introductions
Biological control

Accidental
"Contaminants" in traded commodities
"Hitch-hikers" in other consignments
Ballast material from ships
Escaped pets, or other captive species

As in continental systems, whilst most invasive species are exotic, native species can also become invasive in island ecosystems, usually in response human disturbance of habitats. For example, the Bermuda Cedar *Juniperus bermudiana*, an endemic tree, spread across Bermuda after human colonisation, establishing a virtual monoculture in many areas that had previously supported more diverse plant communities (Wingate 2001). Ironically, the Bermuda Cedar was subsequently almost wiped out by an invasive exotic scale insect, and has now largely been displaced in the plant community by non-native *Casuarina*.

Dealing with invasive species

In tackling invasive species problems, it is generally the case that *control* measures (including eradication) are only likely to succeed if they are applied at an early stage, or on sites that can be relatively well-protected against reinvasion. Consequently, *prevention* rather than control is likely to be more cost-efficient and effective as a basis for the management of species invasions. However, islands (by virtue of the strong dispersal barrier that the surrounding ocean represents) are relatively promising sites for attempts at control or eradication of invasive species. Veitch (1998) notes that rat eradication is eminently feasible on islands up to 2000ha in area, or larger in some cases, and that more than 80 islands have been successfully cleared of rodents. Details of many invasive species eradication projects on islands are given in Veitch & Clout (2002).

Although prevention and control measures are clearly critical in the management of invasive species threats, it is invariably the case that efforts to put management strategies in place also require considerable efforts in gathering and managing relevant data (so that informed decisions can be made), and awareness raising across all levels of society (so that the importance of the issue is more widely appreciated, and political will to address it is generated).

Sharing of experience is vital to dealing with invasive species threats, to minimise duplication of effort, enhance co-operation and increase the speed with which effective strategies can be developed and implemented. The following sections provide a summary of some of the resources that are available internationally to assist in understanding and managing invasive species threats (particularly in island situations), and the outputs of a workshop session where conference delegates shared some of their experiences with the invasive species problem.

Available resources on invasive species

International initiatives on invasive species
As awareness of the importance of invasive species issues grows, a number of initiatives are being developed at local and regional scales. These are vital for the development of legal frameworks and practical management strategies. However, co-ordination at a global level is also important, to minimise duplicated effort and maximise exchange

of information and ideas.

GISP – The Global Invasive Species Programme
(http://jasper.stanford.edu/gisp/)
GISP was established in 1997, as a partnership between IUCN (the World Conservation Union), SCOPE (the Scientific Committee on Problems of the Environment) and CABI (CAB International). It has become an international partnership network of governments, institutions and individuals from many disciplines and backgrounds, working towards the GISP mission: To conserve biodiversity and sustain human livelihoods by minimising the spread and impact of invasive alien species. GISP is the main vehicle for tackling invasive species issues under the CBD (Convention on Biological Diversity), and works through: awareness raising, establishment of linkages and networks, co-ordination of workshops, summarising scientific and technical information. GISP's activities focus primarily, but not exclusively, on invasive species issues in developing countries.

ISSG – Invasive Species Specialist Group
(http://www.issg.org/)
The ISSG is part of the Species Survival Commission of the IUCN. It is an international group of 146 scientific and policy experts on invasive species from 41 countries, working towards the ISSG mission: To reduce threats to natural ecosystems and the native species they contain by increasing awareness of invasive alien species, and of ways to prevent, control or eradicate them. ISSG provides advice on threats from invasive species and on control or eradication methods. Its activities focus primarily on invasive species that cause biodiversity loss, with particular attention to those that threaten oceanic islands.

Co-operative Initiative on Island Invasive Alien Species
(http://www.issg.org/islandIAS.html#IslandIAS)
Invasive species problems can be particularly acute on islands (hence the ISSG's particular focus in this area). This ISSG initiative exists to facilitate co-operation in key areas of invasive species management towards the conservation of island biodiversity. The pacific region has provided a particular focus, but the initiative has a global remit.

Communication resources relating to invasive species
Electronic communication allows rapid exchange of information and ideas. General electronic discussion forums, at a local or regional level, such as Caribbean Biodiversity e-mail group (http://groups.yahoo.com/group/caribbean-biodiversity/) often carry information on invasive species issues. However, the following are (respectively) key resources globally, in the Caribbean, and for the UK Overseas Territories, in relation to invasive species specifically.

Aliens-L
The ISSG's Aliens-L listserver is the premier international electronic forum for discussion and information exchange on invasive species. To subscribe, send an email without a subject header to: Aliens-L-join@indaba.iucn.org with the message "subscribe to Aliens-L". For further information, see the ISSG website.

Caribbean Invasive Species Threats
This electronic forum, moderated by CAB International, allows exchange of information and experience in relation to invasive species threats in the Caribbean. To subscribe, send a blank e-mail to carib_ias_threat-subscribe@yahoogroups.com or visit
http://groups.yahoo.com/groups/carib_ias_threat/

A "Breath of Fresh Air" Discussion Forum
(http://www.activeforums.co.uk/Public/)
The UKOTCF (Overseas Territories Conservation Forum) website hosts this electronic forum for discussion of issues relating to the UK Overseas Territories. Invasive species issues have their own discussion group here, for the exchange of views and information.

Publications on invasive species
Aliens Newsletter
(http://www.issg.org/newsletter.html#Aliens)
Produced twice-yearly by the ISSG, this newsletter provides very readable articles, reviews and other information on invasive species issues (particularly in a conservation context).

Biological Invasions
(http://www.kluweronline.com/issn/1387-3547)
An academic journal which provides detailed research and review articles on invasive species issues.

100 of the World's Worst Invasive Alien Species
A booklet published by ISSG – very useful material for environmental education. Available as a pdf file (Adobe Acrobat Reader required for downloading) from the ISSG website at:

http://www.issg.org/booklet.pdf

Turning the Tide: The Eradication of Invasive Species
C.R. Veitch & M.N. Clout (2002). Published by IUCN.
This very recently published book provides the proceedings of an international conference on the eradication of island invasives.
For details see: http://www.issg.org/Eradicat.html

Invasive alien species: A Toolkit of Best Prevention and Management Practices
R. Wittenberg & M.J.W. Cock (2001). Published by CAB International on behalf of GISP.
This book provides practical advice, illustrated with numerous case-studies, on prevention and management practices. Available from CABI (http://www.cabi-publishing.org/) or IUCN (http://www.iucn.org/bookstore/).
Also available as a pdf file (Adobe Acrobat Reader required for downloading) from the GISP website at: http://jasper.stanford.edu/gisp/100Toolkitfin.pdf
Also available in interactive web format at: http://www.cabi-bioscience.ch/wwwgisp/gt1goto.htm

A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species
C. Shine, N. Williams & L. Gundling (2000). Published by IUCN on behalf of GISP.
Aimed at law and policy-makers, this volume provides guidance on developing or strengthening legal and institutional frameworks for addressing the invasive species problem, in the context of existing international agreements and regional instruments. Available from IUCN (http://www.iucn.org/bookstore/).
Also available as a pdf file (Adobe Acrobat Reader required for downloading) from the CBD website at: http://www.biodiv.org/doc/meetings/sbstta/sbstta-06/information/sbstta-06-inf-08-en.pdf

IUCN Guidelines for the Prevention of Biodiversity Loss Caused by Alien Invasive Species
A set of general guidelines on addressing invasive species issues, prepared by the ISSG in 2000. Available at: http://www.iucn.org/themes/ssc/pubs/policy/invasivesEng.htm

Invasive species in the Pacific: a technical review and draft regional strategy
G. Sherley (ed.) (2000). Published by the South Pacific Regional Environment Programme, Samoa.
This volume collates technical information, and provides a regional strategy for the management of invasive species threats across the islands of the South Pacific. Available as a pdf file at: http://www.hear.org/pier/pdf/invasive_species_technical_review_and_strategy.pdf

Other resources relating to invasive species
Global Invasive Species Database (http://www.issg.org/database/welcome/)
The ISSG is currently expanding this database, which is likely to become one of the most important international reference points for invasive species information. The database can be searched by species name, locality, habitat type and other ecological categories.

Other resources relating to islands
Again, it is worth mentioning resources such as the Caribbean Biodiversity e-mail group (http://groups.yahoo.com/group/caribbean-biodiversity/) which do much to further information exchange and co-operation between island communities at a local or regional scale. However, the following has recently been established, with a global remit.

Global Islands Network (http://www.globalislands.net/)
GIN is a recently established, non-profit organisation with a mission to: Conduct and promote culturally appropriate, ecologically sound, economically sustainable and socially equitable development on islands worldwide. The GIN website provides useful links to a range of resources and information on islands, at a local, regional and global scale.

Dealing with invasive species: sharing knowledge and experience - Workshop output

Rapporteur: Dr Annie Glasspool

Territory	Raising awareness	Invasive control	Invasive prevention
Anguilla	• We need to define who/when we decide a species is invasive, because sometimes it is difficult to determine whether or not a problem species arrived naturally.		• Some species invasive in one area are not necessarily invasive elsewhere which impacts whether or not it becomes a priority. (Casaurina??)
Ascension	• A decision was made to control the feral donkeys – a letter was written to local newspaper asking for public input – no one responded until one week's notice was given that the donkey's were to be castrated – at which point a 300 person petition was presented and the donkeys were left in peace	• Investigate the commercial value for invasives to encourage eradication • Importance for legislation, but needs to be enforced • Lack of enforcement has resulted in import of non-spayed kittens	
Australia	• There is a move to celebrate the 'Easter Bilby' – success story		• Very strict on imports from Malawi
Bahamas	• Working with one Architectural firm to develop of photo series of land they are working on, documenting existing natives, and the difference in care needed for native plots versus plots planted with introduced spp. • Hutia – endangered species is actually destroying the entire ecosystem	• Casaurina's a problem, but something is now starting to kill them • There is a different standard of requirements for foreign versus local development – eg. regulations for local development don't exist and many lots once cleared are left barren for many years	• Container ships are a concern both in terms of checks and contingency planning in the event of an accident

Bermuda	• We need to identify ALL stakeholders • We need to engage and get buy-in from identified stakeholders • There is a lack of guidance/ information about plants being sold in private nurseries (invasives are being sold locally) due to a lack of awareness amongst nursery owners • Awareness was raised during hurricane Emily because native species survived much better than the invasives • Need to promote the existing plant voucher scheme whereby you are given x free plants when you have a planning application • Olivewood is in scale with small lot properties – no leaf problem for home owners – needs to be promoted • Use tourism to highlight natives – ditch the use of invasive species in brochures etc. • Learning through landscapes programme – encourages awareness through native plantings, plus encourage closer interaction with environment and enhance the school environment	• Need to be sure that we can meet demand with replacement species • Currently resources are lacking with regards to meeting demand (money, facilities, skills) • Dept of Planning initiated a programme so that the Cons. Officer can assist local landowners in a woodland management plan for their property – but if it expands, supply may become an issue • Get tourists to come and get involved in culling programmes – eg. through Earthwatch. • Toad exclusion barrier established on Nonsuch as a localized control • Eradication in a localized area can provide data which can be used to promote further eradication	• Some species can be recognised a priori as being invasive • Regulation of pet trade needed but there are no native species to serve as alternatives; pets which cannot survive in the wild should therefore be selected.

	• We gloss over some invasives because of their cultural identity eg. Whistling frog, grass species, Brazil pepper (important for bee keepers) • So, how would people who currently benefit from invasives be compensated? • Could promote use of Casaurina for firewood • Islanders need to accept that some pets are not appropriate on an oceanic island • Cane Toad not flagged as a problem species in Bda but perhaps this reflects lack of information • Highlights power of public awareness – toad has been promoted in the last few years as a flagship for environmental health but that has been misinterpreted as a concern for the Cane toad itself • Shouldn't ignore the value of pets in establishing respect for nature – but it is responsible pet ownership that needs to be promoted		
British Virgin Islands	• Can insist on planting of natives by public institutions • There are high costs associated with contractors working around existing natives so they tend to be removed		

Cayman	• Some invasives are a part of the local culture – meaning that the task in public awareness would be enormous • Promote planting of native species along with promoting the need to eradicate invasives • National Trust is currently working on public awareness. But exotics are produced much more cheaply than natives, making marketing them hard • Education is needed so that when people are clearing land, natives are left in place • Recommendations of how much (minimum) native vegetation should be left was made in the Planning Statement but it has since been removed • Problem with algae being produced for aquarium trade	• It is cheaper for plants to be imported than grown locally • Could the local Government restrict imports or subsidise local production – unless this is done, there is currently no incentive for local production	• Regulation of pet trade needed but no native species as alternatives – but at least select pets that simply cannot exist in the wild in a particular jurisdiction.
Cyprus	• Cannot remove any tree from a property unless it is disrupting the foundations		
Falklands	• Increase in environmental awareness has prompted wider use of biological controls, in the absence of sufficient information	• Reindeer introduced	
Isle of Man	• Need to map data to demonstrate scale of problem in order to secure further support/ justification of resources	• Misidentification of species can be a problem – resources used when not necessary	

Jersey	• Have introduced species which have become flagship spp. Eg the Red squirrel • Need to consider why people adopt such species – get to the root cause • People are confused by the message that is being sent • Reinforce the damage that is being done by a species		
Montserrat	• Still trying to get construction companies to stop clearing areas – to leave natives		
Netherlands Antilles	• Husbandry – eg. Goats • Ballast water	• Husbandry – eg. Goats	
Pitcairn		• Culling of invasives encouraged by promoting use of felled trees for firewood – and natives to replace them	• More imports coming from Polynesia now – concerns for prevention of introduced species associated with this
South Africa	• Declared list of invasive species • Benefit to having demand greater than supply if not excessive and if marketed appropriately		• Fines for having an invasive species on property • Problem with Government personnel 'being allowed' to bring in pets • Don't just focus on invasives – danger of complacency regarding those just considered to be introduced – as oceanic islands we cannot afford to ignore these

St. Helena	• Success story with Ebony	• Value of Opuntia for Vitamin C hadn't been taken into consideration, nor had impact of its removal on hillsides • Can't please everyone – concern at the airport about increasing birds and safety issues	• A problem with diseased lemon segments imported prompted better regulations on importations – phytosanitary certificates etc. – but no one is currently considering wood imports
Turks and Caicos	• A research interest group has held a workshop to raise awareness of the invasives problem • Signage is used to illustrate native species • Plants sales are held to encourage purchase of natives • Award scheme is being implemented to encourage native plantings • Visit schools – requests for labeling of plants to identify natives • Enough information currently exists to demonstrate the threat of cats to iguanas – a great example of where an eradication programme is needed	• Should be conditions attached to planning regulations – when and area is cleared, it must be replaced with natives • Space is being provided in private nursery to Trust to propagate natives • Casaurina's introduced (by Bermudians) are becoming a problem – Bermuda has offered to subsidise some replacement planting with natives • A bush walking crew conducts plant rescue exercises – but only 20 people involved • A flagship spp is the Iguana, but feral cats impacting iguanas	• There is trading with the Dominican Republic for fruit and vegetables – but plants are brought in, unregulated (the same is true with pets – no papers/quarantine are required)

UK	• Need to eliminate the jargon associated with invasives – a problem was identified in trying to raise awareness of the issue in ethnically diverse schools which led to misunderstandings • Talk about species which are destructive and damaging (might include endemics too). This might lead to economic incentives eg. Insurance issues surrounding casuarinas • People are deliberately planting introduced species in nature reserves to 'increase the biodiversity' • Need to come up with costs of dealing with invasives to catch the attention of the politicians • If pet imports are suspended, pet traders refocus on other species which are also problematic • Promote prose, storytelling etc. to tell the knock-on effects – eg. The Lighthouse Keepers Cat	• Cross-departmental control of the issue can mean that decisions don't actually get made – need to have one department in control • Control does involve public awareness	• Imports can be suspended – currently in place for Red-eared Slider terrapin and American Bullfrog • Need to establish a committee to develop a list of potentially invasive species • Establishment of global databases such as GISP will help
US	• Promotion of good practices important – need to work more closely with horticultural industry • "Barking up the wrong tree" -good catch phrase!	• Use of prisoners to work on environmental projects has been successful	

Other	• Must stress the positive element – focus on the fact that a native species will be promoted – not so much the eradication of an invasive species • Let's not forget inorganic invasive species – ie trash • Can't ignore the fact that introduced species are attractive to people – (colourful, cuddly etc)	• Control often takes a long time and ongoing monitoring and funding is essential • How can we make use of our destructive urges constructively – introduce a tally to encourage competitive nature • Danger that an invasive plant might not be recognised if you are recruiting volunteers and the wrong plant may be culled • Marine litter is a major means of dispersal of 'invasive species • FRONTIER – paid customers to 'volunteer' for projects but marketing is not easy – need a very clear idea of what the programme involves – people need a structured programme – not just pulling up trees • Need for pilot projects • Most eradication programmes have been done as a last resort but have lacked the resources for follow-up studies • Spaying and neutering should be a requirement but often not realistic • Water hyacinth considered for brickettes for burning in Malawi	• Need to consider issues of disease when considering reintroducing native species • Need for exchange of information about good practices between territories • Capacity is often lacking at point of import – so certificates can be issued at point of export – but soil for example presents problems • Use of dedicated containers to particular locations

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CAB International and biological control of invasive species (posters)

Oliver D. Cheesman

Cheesman, O.D. 2003. CAB International and biological control of invasive species. pp 273-274 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

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An introduction to CAB International (CABI) is provided elsewhere in these Proceedings (p.177). One of CABI's major interests throughout its long history has been the use of biological control – the release of natural enemies of weeds or pests, to suppress their populations. For many years, CABI operated a specific body to co-ordinate work in this area (the Commonwealth Institute of Biological Control, later the International Institute of Biological Control). It has published catalogues of biological control agents used against pests in different regions of the world, such as Cock (1985) for the Caribbean and Bermuda, and a global catalogue of weeds and their biological control agents (Julien & Griffiths 1998). CABI continues to research and implement biological control programmes and regularly publishes reference materials (such as *Biocontrol News and Information*).

Agricultural weeds and pests provide some of the most obvious early examples of damaging invasive species. Biological control has been used to counter them for over 100 years. There is an increasing interest in the use of biological control against invasive species in natural as well as agricultural ecosystems. With increasing sensitivity to the negative impacts that alien species can have, it may at first seem counter-intuitive to import deliberately more non-native organisms in attempts to control one that has become invasive. Some examples of "biological control gone wrong" are well known – the Mongoose in the Caribbean, the Cane Toad in Australia. However, these are invariably amongst the earlier attempts at biological control, involving poorly or un- regulated programmes, where the negative impacts could easily have been predicted, if only the underlying ecology of pest and natural enemy had been considered. Although poorly regulated biological control programmes remain a potential danger, international standards have been set for the use of the technique (FAO, 1996). Rigorous screening for potential impacts on non-target organisms is clearly an essential part of any responsible biological control programme (Thomas & Willis 1998).

Biological control is not always appropriate, nor is it always successful. However, in the right situation it can represent an unrivalled technique for the control of invasive species. Alternative techniques, such as chemical and mechanical control, are often damaging to the environment, costly and labour intensive – often needing to be repeated year after year. Such techniques may simply be impractical, because of the topography of the affected area, or because the invasion is too far advanced. For a relatively small initial investment, biological control can provide a self-sustaining solution – using biodiversity to protect biodiversity (Anon. 1994).

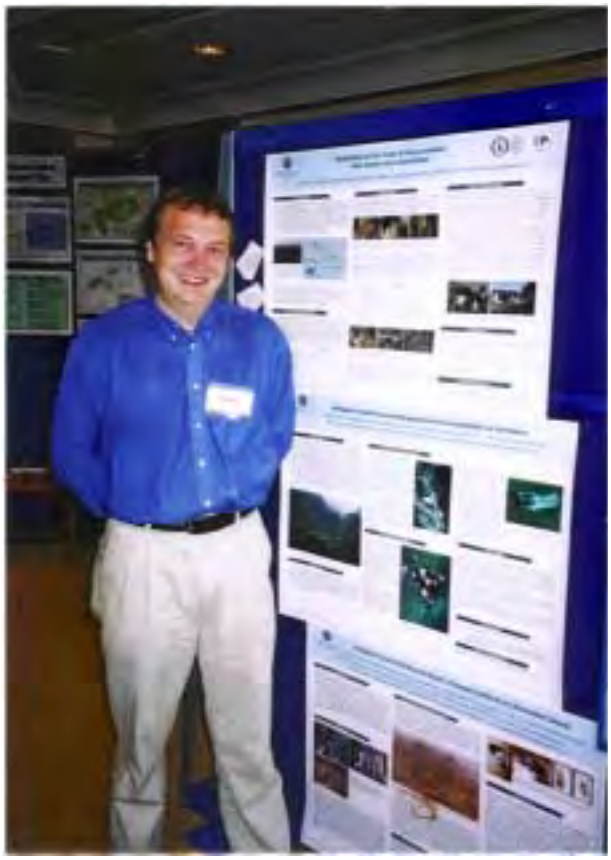
Successful biological control programmes are often forgotten – once a weed or pest problem has been eliminated, it is easy to forget that it ever existed. Nonetheless, spectacular success stories, like the clearance of invasive *Opuntia* cactus in Australia in the 1920s and 30s, are not difficult to find. Although economic analyses are scarce, successful biological control programmes are estimated to have saved millions of dollars (Greathead 1995).

The following poster presentations describe some of CAB International's recent work with biological control in the UK Overseas Territories; not against agricultural pests, but against environmentally damaging invasive species.

The work to protect the endemic Gumwood Tree on St Helena was one of the first examples of biological control being used successfully to save

from extinction a rare species threatened by an invading alien pest. The success of this programme paved the way for the restoration of the Gumwood (the Millennium Forest Project) on St Helena – see Cairns-Wicks & Peters (2001).

Although further effort is needed on Ascension Island, to follow up on initial attempts at biological control of Mexican Thorn, the work conducted there may have contributed to slowing the spread of this pernicious weed. Biological control may provide the only practical solution to the environmental threats posed by this vigorously invasive alien plant on the island, and would complement work undertaken by the RSPB to control cats and rats – see George & White pp.155-160 in these Proceedings.



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The following two posters should be cited as:

Shaw, R. & Fowler, S. 2003. Biological control saves endangered tree from extinction on St Helena. p 275 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Djeddour, D., Cheesman, O.D. & Fowler, S. 2003. Biological control of Mexican thorn *Prosopis juliflora* on Ascension Island. p 276 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

Biological Control saves endangered tree from extinction on St Helena

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Introduction

St Helena, one of the UK's Overseas Territories, is a small volcanic island, approximately 14 million years old. It is situated in the southern mid-Atlantic, around 2000km east of Angola on the western coast of Africa. Despite its diminutive size (122km^2), and the effects of widespread environmental degradation, the island's flora and fauna is of international importance, including 10 endemic genera and 37 endemic species of flowering plants (Ashmole & Ashmole, 2000). Amongst these is the St Helena gumwood *Commidendrum robustum*, a giant member of the daisy family (Compositae). This is the national tree of St Helena, and once formed an extensive forest across parts of the island. However, this special plant is now represented by only 2500 trees at Peak Dale and these were, until recently, under threat of extinction.

Figure 1: Gumwoods on St Helena

The Enemy

In 1991, the scale insect *Orthezia insignis* was identified attacking the remaining gumwood trees. This insect is a common pest in tropical countries and is likely to have been introduced onto St Helena accidentally in the 1970s or 1980s. It proved difficult to control with insecticides because the places where the surviving gumwoods grew were relatively inaccessible.

The Threat to the Gumwood

O. insignis was capable of killing trees partly by its sap-sucking feeding activity, but also because of the sooty mould that grew on the honeydew produced by dense scale infestations. Not only was the gumwood (and the native species associated with it) under threat, but the wide host range of the pest meant that other endemic plants were likely to be attacked as well.

The situation was becoming desperate: between 1991 and 1993 around 100 trees had died, and increasing numbers were becoming heavily infested. CAB *International* (CABI) were approached to investigate alternative methods of pest control.

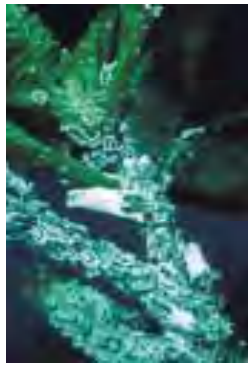

Figure 2: An infestation of *Orthezia insignis*

The Natural Solution

Fortunately, this particular pest was no stranger to CABI's biological control scientists. Research revealed that between 1908 and 1959 a predatory ladybird beetle, *Hyperaspis pantherina*, had been used to control the scale insect in Hawaii, four African countries and Peru, with substantial success in most cases.

Consequently, the beetle was imported into CABI's UK quarantine facility so that its taxonomy, life history and environmental safety could be studied in detail (Booth *et al.*, 1995).

Figure 3. The specialist predatory ladybird beetle, *Hyperaspis pantherina*

In two years of study, only one egg was laid by this ladybird in the absence of the target pest, indicating a high degree of specificity to this species of prey. Furthermore, all the other scale insects and mealybugs recorded from St Helena were known to be introduced species, and most are pests. As a result of this work, the Government of St Helena gave permission for the release of the predator for the control of *O. insignis*. In May 1993, 80 individual beetles survived a 6 day air and sea journey to the island.

Figure 4. *Orthezia insignis* adult with the oval grey egg of the predator laid on its back (see arrow)

The Results

With an enormous source of prey, a mass-rearing programme initiated on St Helena by local staff allowed continual releases of beetles in 1993, onto gumwood trees infested with *O. insignis*. The programme culminated in the mass release of 5,000 beetles in early 1994. By 1995, the mass rearing programme had to be abandoned, because insufficient prey could be found on the island!

Since 1995, there have been no further problems with *O. insignis* on St Helena, and restoration projects involving extensive tree-plantings are under way to re-establish the gumwood populations.

This project used nature to control nature, and restored the balance which had been upset by human activities. It is fair to say that this little ladybird has saved another species from likely extinction in the wild.

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Acknowledgements

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Biological control of Mexican thorn (*Prosopis juliflora*) on Ascension Island

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Introduction

Ascension Island, one of the UK's Overseas Territories, lies in the equatorial Atlantic Ocean, 1200km northwest of the island of St. Helena and 1700km from the African mainland. A young volcanic island, approximately 1 million years old, it covers 98km^2 and has a naturally dry, barren landscape, largely covered by basalt lava fields and cinder cones. Although Ascension supports relatively few indigenous species, a number of important endemics occur amongst its flora and fauna (Ashmole & Ashmole, 2000). The barren landscape itself represents a rare set of natural habitats, but the island has suffered serious ecological degradation as a result of human exploitation and species introductions.

The Enemy

Figure 1: Mexican thorn (*Prosopis juliflora*). Foliage (top left); Flowers and seed pods (top right); thorns (left - photo from Queensland, Australia, courtesy of Colin Wilson, Parks & Wildlife Commission NT)

The Mexican thorn *Prosopis juliflora* is a spiny, leguminous tree which has spread from its native geographical range (centred on Central America) to become a serious invasive alien weed in many parts of the world. *Prosopis* appears to have been accidentally introduced onto Ascension Island in the 1970s or 1980s. The plant grows very rapidly, and trees (which can reach 15m in height) often form dense thickets. On Ascension, the spread of *Prosopis* is assisted by the local population of feral donkeys, which eat the seed pods, and then distribute the seeds in their droppings. The plant represents a serious threat to the indigenous biodiversity of the island, as well as causing serious amenity problems.

The Threat to Ascension Island

Despite being a relatively recent arrival, *Prosopis* has spread very rapidly on Ascension, and is present over approximately 75% of the island. Tracks and paths have become blocked by impenetrable Mexican thorn thickets, and the plant's thorns cause punctures to the tyres of motor vehicles and bicycles. A significant fire risk will also develop as dead wood accumulates, as it burns very easily.

Figure 3: The naturally barren landscape of Ascension Island is now speckled with the green of Mexican thorn bushes (photo taken August 2000 by Nick Jewsbury).

In biodiversity terms, the rapid spread of *Prosopis* threatens to drastically alter the unique landscape of the island and obscure many of its fascinating volcanic features. These barren habitats are home to a small but interesting endemic invertebrate fauna, which could be lost as the Mexican thorn spreads further. In addition, *Prosopis* threatens to suppress important endemic plants such as the rare *Euphorbia origanoides,* and invades the nesting sites of green turtles and sea birds. The Mexican thorn thickets also provide cover for introduced animals, such as rats and cats, which themselves threaten to devastate the island's biodiversity.

The Natural Solution

CAB *International* conducted a study of the potential for biological control of Mexican thorn on Ascension Island during 1996/7 (Fowler, 1998). Although chemical control and mechanical removal of *Prosopis* is possible, this is not a practical solution now that the plant has spread so far. Based on work conducted in South Africa, two species of bruchid beetles (which attack the seeds of the plant) were identified as possible biological control agents: *Algarobius prosopis* and *Neltumius arizonensis*. Releases of adult beetles were conducted on Ascension in May 1997.

Figure 3: Adult *Algarobius prosopis* emerging from a seed pod (left); adult *Neltumius arizonensis* (top centre); *Prosopis* biological control agents featured on Ascension Island stamps (top left)

The Results

Initial observations suggested that both beetles had established populations on Ascension Island. Subsequent work suggests that *Neltumius* may have since died out, but that *Algarobius* has successfully spread through much of the Mexican thorn on Ascension, where it may be destroying around 50% of the seeds produced by the plant (Jewsbury, 2001). Nonetheless, this may be insufficient to halt the spread of *Prosopis*, and additional work may be necessary to control the plant on the island. Fowler (1998) suggested that further biological control agents might be required, acting alongside the two bruchids released in 1997, in order to counter the spread of Mexican Thorn on Ascension Island.

Reports of *Neltumius* and/or *Algarobius* attacking Seed-work Acacia *Leucaena leucocephala* on Ascension are (as expected) incorrect . An entirely different beetle, *Acanthoscelides suramerica*, is responsible for the damage to Acacia (Jewsbury, 2001).

A recent conservation management plan for Ascension Island (Pickup, 1999) recognises Mexican thorn as one of the most important threats to local biodiversity, along with introduced rats and cats. Further funding is required to progress the biological control initiative against Mexican thorn on Ascension Island.

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Acknowledgements

CABI Bioscience's 1996/7 work on biological control of Mexican Thorn on Ascension Island was funded by the Foreign & Commonwealth Office of the UK Government. Roger Booth of the British Museum (Natural History) provided identification of *Acanthoscelides suramerica.*

Mink *Mustela vison* eradication in the Western Isles, Scotland, UK (poster)

Niall Moore and Sugoto Roy, Central Science Laboratory (Defra)

Moore, N. & Roy, S. 2003. Mink *Mustela vison* eradication in the Western Isles, Scotland, UK. p 277 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

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Invasive non-native species cause the greatest loss of biodiversity on oceanic islands. The American mink *Mustela vison* is a non-native small carnivore which has become established throughout the UK following escapes from fur farms since the 1920s. Farmed mink escaped in the Western Isles (Scotland) and a feral population is now established on 75% of the 2,800 km^2 archipelago.

Mink threaten internationally important ground-nesting bird populations (mainly terns) by predation of eggs and chicks. A five-year eradication scheme is attempting to reduce the impact of mink and assess the feasibility of a pan-archipelago eradication scheme. The project is funded by the EU LIFE-Nature Fund and a consortium of local bodies led by Scottish Natural Heritage, with the work being carried out by staff from Central Science Laboratory.

The main aims of the scheme are to eradicate mink from a 750km^2 trial area of the Western Isles, to collect data for modelling full eradication, and also to remove feral ferrets *Mustela furo*, another alien small carnivore. The main method employed is live-capture cage trapping using 2,500 traps over a five-year trapping campaign. Dogs are used to locate den sites.

The project has just completed its first 16 months of trapping and has achieved over 62,000 trap-nights with 230 mink and 139 feral ferrets caught to date. Mink population densities are substantially lower than previously thought. Most of the mink are confined to the coast with the highest densities on small offshore islands, many close to seabird colonies.

Trapping at den sites has proved highly successful when mink are breeding (a period during which normal line-trapping is unsuccessful). Locating mink dens using dogs has also proved very effective. The use of scent-gland-based lures has improved efficiency, doubling the capture rate. Traps on floating platforms and the use of mirrors are also being investigated.

Tern colonies have been counted and breeding success estimated to compare with future trends. As mink numbers decline, rat *Rattus norvegicus* captures have increased, suggesting possible mesopredator release. Modelling indicates that 80-85% of the mink population must be removed *per annum* to cause extinction in five years.

Mongoose management to protect endangered pink pigeons in Mauritius (poster)

Sugoto Roy, Central Science Laboratory (Defra), Carl Jones, Mauritian Wildlife Foundation and Stephen Harris, University of Bristol

Roy, S., Jones, C. & Harris, S. 2003. Mongoose management to protect endangered pink pigeons in Mauritius. p 278 in *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, www.ukotcf.org

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The small Indian mongoose *Herpestes javanicus* was introduced to several tropical islands to control rats in the late nineteenth and early twentieth centuries. Seventy five percent of these islands fall within biodiversity hotspots. Its introduction has coincided with the extinction or population demise of several rare and endemic birds and reptiles.

Nineteen mongooses were introduced to Mauritius in 1902, and a century later the species is now widespread. The pink pigeon *Columba mayeri* is a species endemic to Mauritius whose wild population has increased from nine adults in 1990 to over 400 today through long-term intensive management, of which invasive predator management forms an integral component. Mainland populations of pigeons are currently managed at only four sites. These populations stem from a remnant population from which the species has been bred and re-introduced. Pigeons are vulnerable to ground predators such as mongooses, which are controlled using box traps laid out in grid systems. Although successful, the technique is labour intensive and needs to become more efficient to be sustainable in the long-term.

Mongoose ecology was studied to optimise management by targeting the right habitats and spacing traps optimally. Mongooses were trapped, some were radio-tracked, while culled specimens provided data used for population modelling.

Mongooses used riparian, rocky and woodland habitats preferentially within their home ranges. This was partially corroborated by a study which found that traps in forest thickets were most successful. Indirect census data also show that density was higher in degraded woodlands and riparian habitats. The mean home range size (MCP) was 0.77/km^2, and ranged from 0.25-1.1/km^2. Density estimates ranged from 25.6 - 52.4 animals/km^2 (mean 37.3). Home ranges overlap considerably, suggesting that the species is not territorial.

The diet was broad: birds occurred in 6% of mongoose guts (n = 458), predation on pigeons was low (n = 5). However, modelling has shown that low level predation can affect long-term viability of pigeon populations. Mongoose control reduced pigeon mortality rates in the site with the longest history of management.

Control regimes could be improved as follows:

- *Trap siting:* Efforts should be biased towards preferred habitats, i.e. rocky areas, forest thickets and riparian habitats.
- *Trap spacing:* Trap spacing should correspond with home range sizes of mongooses (the smallest was 0.25 km^2). Greater trap densities should improve capture rates.
- *Diet:* Rats are frequently eaten, so controlling mongooses alone may cause future rat problems through meso-predator release. Carrion is consumed frequently, so poisoning is a potential alternative mongoose control method.

Appendix 1. Final published programme for the conference

Most of the conference organising committee breath several sighs of relief after the closing dinner at the Aquarium: Mike Pienkowski, Amanda Outerbridge, Andrew Dobson, Annie Glasspool and Jack Ward.

But where is Frances Marks - surely not still conducting coach transfers?

A Sense of Direction

a conference on conservation in UK Overseas Territories and other small island communities

Bermuda 22nd-27th March 2003

Organised by:
Bermuda Ministry of Environment, Bermuda National Trust, Bermuda Zoological Society, Bermuda Audubon Society and UK Overseas Territories Conservation Forum

Bermuda hosted an international environment conference from 22nd to 27th March 2003, with a focus on UK Overseas Territories and other small islands.

The conference was organized jointly by the Bermuda National Trust, the Bermuda Zoological Society, the Bermuda Audubon Society, the Bermuda Ministry of the Environment and the UK Overseas Territories Conservation Forum. It was the third such conference following those held in London and in Gibraltar. The proceedings of the Gibraltar conference can be seen at www.ukotcf.org

The conference provided a forum for government environmental agencies and NGOs to discuss key conservation issues, to highlight success stories, exchange ideas, and to forge partnerships. It was planned that Overseas Territories and other small island communities that share similar environmental problems should benefit from Bermuda's experiences and history of planning and conservation initiatives. Bermuda planned to learn from the success of environmental programmes tried and tested elsewhere.

The main topics were determined after wide consultations amongst conservationists working in the Overseas Territories. The sessions were:

- Conservation issues of Bermuda and conference initiation by field visit
- Environmental Charters and strategic planning
- Managing conservation organizations
- Implementing management plans
- Climate change
- Dealing with invasive species

The detailed programme is below.

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The organisers are grateful for support from:

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The Environment Fund for Overseas Territories of the UK Foreign and Commonwealth Office
Bank of Bermuda Foundation
Capital G
Fidelity Investments
XL Foundation

CONFERENCE PROGRAMME

Sat 22 March	**Arrival day**
	Set up displays **Salons B & C**
5pm-8pm	Registration desk open
	Dinner **(own arrangements)**
Sun 23 March	**Topic 1: Conservation issues of Bermuda and conference initiation by field visit**
7.30am-8:30am	Continental breakfast / Registration desk open **both in Ballroom Foyer**

8:30am	Introduction to Bermuda's environment *Amanda Outerbridge, Executive Director, Bermuda National Trust; Andrew Dobson, Vice-President, Bermuda Audubon Society; Wayne Carey, Vice-President, BNT; and Jack Ward, Director, Dept of Conservation Services* - **Ocean Suite**
9:15am	Conference group photograph - **Hotel Front Steps**
9:30am	Coach tour, with commentary on features of interest. The coaches will visit Gibbs Hill Lighthouse (best view of development across the Island), walks at Spittal Pond and Walsingham, and Nonsuch Island (*Jeremy Madeiros, Terrestrial Conservation Officer, Bermuda Dept. of Conservation Services)*. The groups will travel on two buses, meeting at 1pm for buffet picnic lunch.
5:15pm	Arrive back at hotel
6:30pm	Reception **Paget Suite**
7:15pm	Dinner - **Ocean Suite** Official opening *Premier of Bermuda, The Hon. Jennifer M. Smith, DHumL, J.P., M.P.* Key note speaker *David Suzuki, David Suzuki Foundation, Canada* Amanda Outerbridge introduces Premier/ Andrew Dobson introduces Dr Suzuki
Mon 24 March	
7:30am	Continental breakfast / Registration/Information Desk/Displays open
8:45am	Welcoming address **- Ocean Suite** *The Hon. Dennis Lister, Minister of the Environment* Mike Pienkowski introduces the Minister
8:55am	**Topic 2: Environmental Charters and strategic planning - Ocean Suite** Review of progress in different UKOTs in implementing the Environmental Charters and getting biodiversity into other sectoral plans – including obstacles so that we can discuss overcoming these. *Chaired by: Dr Mike Pienkowski, Chairman, UKOTCF;* *and Avon Carty, Anguilla National Trust*
9-9:15am + 5 min discussion	A Biodiversity Strategy and Action Plan for Bermuda *Dr Annie Glasspool, Bermuda Zoological Society*
9:20-9:35am +5 min discussion	Facilitating the development of a plan in an example UKOT (Turks & Caicos Islands) for strategic action under the Environmental Charter *Michelle Fulford-Gardiner, TCI Dept of Environmental & Coastal Resources; & UK Overseas Territories Conservation Forum facilitators, Dace McCoy Ground & Mike Pienkowski*
9:40-9:55am +5 min discussion	Strategic conservation in a non-UKOT *Susan Larson, Deputy Director, Bahamas National Trust*
10-10:15am + 5 min discussion	Implementation of the St Georges Declaration of Principles For Environmental Sustainability in the Organisation of Eastern Caribbean States (OECS) and the UK Overseas Territories Environmental Charter: No Conflict *Gerard Gray, Montserrat Government*
10:20-10:45am	Coffee Break – **Ocean Suite Foyer** Display Rooms Open

10:50-11:05am + 5 min discuss	Statutory nature conservation: developing a strategy for the Isle of Man *Liz Charter, Isle of Man Government*
	Integrating environmental conservation into physical and economic planning: the Sustainable Development Planning Initiative [not presented at conference] *Kathleen Forbes & Delton Jones, TCI Dept of Economic Planning & Statistic; and Arlene Dixon, TCI Director of Planning*
11:10-11:30am + 30 min discussion	The UK Government's commitment to the Environment Charter process in the UK Overseas Territories *Valerie Caton, Head of Environment Policy Dept, UK Foreign & Commonwealth Office; with Roy Osborne, Deputy Head, Overseas Territories Dept, FCO; Denise Dudgeon, EPD, FCO; and Joelene Foster, OTD, FCO*
12noon-12:45pm	Discussion focusing on how to help move forward implementation of Environmental Charters
12:45pm	Lunch – **Ocean Suite Terrace (Paget Room if weather inclement)** Display Rooms Open
	Topic 3: Managing conservation organisations - Ocean Suite *Chaired by: Fred Burton, Cayman Islands; & Amanda Outerbridge, Bermuda National Trust*
2-2:15pm + 5 min discussion	Establishing a National Trust in St Helena *Barbara George, Executive Director National Trust; & Isabel Peters, St Helena Govt*
	Harnessing volunteers in Gibraltar [not presented at conference] *Dr John Cortes, Gibraltar Ornithological & Natural History Society*
2:20-2:35pm + 5 min discuss	How to evaluate your organisation's effectiveness as a conservation organisation, using the Bermuda Ministry of the Environment as a case study *Charles Brown, Bermuda Government Management Services*
2:40-2:55pm + 5 min discussion	Falklands Conservation – awareness raising in tourists *Becky Ingham & Ann Brown, Falklands Conservation*
3:00-3:45pm	Coffee Break – **Ocean Suite Foyer** Display Rooms Open
3:50-4:05pm + 5 min discuss	Nature Conservation in the Netherlands Antilles: Five islands (trying) to work together *Paul Hoetjes, Dept of Environment & Nature Conservation (MINA), Netherlands Antilles*
4:10-4.:25pm + 5 min discuss	Collaborating through the Forum's web/database *Frances Marks, Coordinator, UK Overseas Territories Conservation Forum*
4:30-4:45pm + 5 min discuss	BVI National Parks Trust's computerised management system *Joseph Smith Abbot, BVI National Parks Trust*
4:50-5:15pm	Discussion on overcoming challenges in managing conservation organisations to achieve impact, and the advantages of government/NGO collaboration. This session will continue after the break in the form of a discussion on how the Forum can continue to help.
5:15-5:40pm	Coffee break – **Ocean Suite Foyer**

5:45-7:00pm	**Open joint meeting of Forum regional working groups** (session open to all participants, to develop the preceding discussion and to glean ideas on priorities for Forum activities in the views of UKOT bodies) *Chaired by: Michael Gore, UKOTCF Wider Caribbean Working Group; and Ann Brown, UKOTCF South Atlantic Working Group* **Ocean Suite**
7:00-7:30pm	Demonstration and discussion of inputting to Forum web-database **Ocean Suite** *Mike Pienkowski, Chairman UKOTCF*
7:30pm	Session ends/ Conference Desk Open Dinner **(own arrangements)**

Tues 25 March

7:30am	Continental breakfast – **Ocean Suite Foyer** Display Rooms Open/ Hospitality Desk Open
8:30am	**Topic 4: Implementing management plans - Ocean Suite** *Chaired by: Andrew Dobson, Bermuda Audubon Society; and Joseph Smith-Abbott, British Virgin Islands National Parks Trust*
8:35-8:50am + 5 min discuss	Conserving and managing the built environment *Catherine Leonard, The National Trust (of England, Wales & Northern Ireland)*
8:55-9:10am + 5 min discussion	Conservation challenges in small communities: conservation management in the Tristan islands *James P Glass, Natural Resources Dept, Tristan da Cunha; & Dr Peter G Ryan, Percy FitzPatrick Institute, University of Cape Town*
9.:15-9:30am + 5 min discuss	A species action plan for the Uvea parakeet, New Caledonia *Alison Duncan, Ligue pour la protection des oiseaux*
9:35-9:50am + 5 min discuss	Ascension – focus on dealing with invasive species *Richard White, RSPB Project Officer; and Tara George, Conservation Officer, Ascension*
9:55-10:10am + 5 min discuss	Cayman blue iguana management plan *Fred Burton, Cayman Islands*
10:15-10:40am	Coffee break – **Ocean Suite Foyer** Display Rooms Open
10:45-11am + 5 min discussion	A conservation plan involving sustainable development of local community – North, Middle & East Caicos Ramsar site & surrounds *Ethlyn Gibbs-Williams, Executive Director, Turks & Caicos National Trust*
11:05-11:20am + 5 min discuss	Inter-country plan - marine turtles in the Caribbean *Brendan Godley, Marine Turtle Group*
11:25-11:40am + 5 min discuss	A community based management plan for the ormer (*Haliotis tuberculata*) (L.) in Jersey, Channel Islands *Andrew Syvret, Société Jersiaise*
11:45am-12:00pm + 5 min discussion	Introduction to the forthcoming review of potential new Wetlands of International Importance (under the Ramsar Convention) in the UK and the UK Overseas Territories *Mike Pienkowski, UK Overseas Territories Conservation Forum; and David Stroud, Joint Nature Conservation Committee*

12:05-12:20pm	Introduction to field workshops on management planning *David Stroud, Joint Nature Conservation Committee*
12:20-12:45pm	Discussion (further discussion on management plan implementation following morning)
12:45-1:45pm	Lunch - **Paget Suite**
2pm	Conference to divide into small, manageable groups, each to visit one of Bermuda's interesting sites to make a structured effort at developing a plan for aspects of management.
5pm	Leave sites
5:30pm	Arrive back at Hotel Conference Desk Open
6pm	Taxis leave for evening - **Hotel Front Entrance**
6:30pm	Reception at Government House Welcome from H.E. the Governor, Sir John Vereker
8pm	Taxis leave Government House for Hamilton or Elbow Beach Resort
	Dinner (**own arrangements**)

Wed 26 March

7:30am	Continental breakfast – **Ocean Suite Foyer** Conference Desk and Display Rooms Open
8:30am	Wrap up the previous day's session by summaries and discussion. **Ocean Suite**
9:30am	**Topic 5: Climate change - Ocean Suite** *Chaired by: Martin Drury, UKOTCF; and Lynda Varlack, BVI Government Conservation & Fisheries Department*
9:35-10:05am + 10 min discuss	Scientific overview of climate change implications as it relates to small islands *Dr Nick Bates, Bermuda Biological Station for Research*
10:15-10:40am	Coffee break – **Ocean Suite Foyer** Display Rooms Open
10:45-11am + 5 min discussion	British Indian Ocean Territory – island flooding and coral-death related to changes in sea-levels and in temperature *Dr Charles Sheppard, Friends of the Chagos & Warwick Univ*
11:05-11:20am + 5 min discuss	Implications of global warming and sea level rise for coastal nesting birds on Bermuda *David B Wingate & Patrick Talbot, conservationists, Bermuda*
11:25am-12:10pm	General discussion
12:15pm	Lunch – **Ocean Suite Terrace (Paget Suite back-up)**

1:15-3:45pm **Topic 6: Dealing with invasive species: sharing knowledge and experience**
Chaired by: Dr Oliver Cheesman, CABI Bioscience; Dr Colin Clubbe, Royal Botanic Gardens, Kew; Dr Annie Glasspool, Bermuda Zoological Society; and Karen Varnham - **Ocean Suite**

Invasive species are now widely regarded as the second most important threat to biodiversity after habitat destruction. The impacts of invasive alien species are particularly severe on small island ecosystems. This session will comprise a panel-guided discussion, drawing on the knowledge and experience of conference delegates. Three particular themes will be addressed: awareness-raising, prevention strategies and control measures.

3:45-4:25pm Coffee Break – **Ocean Suite Foyer**
Display Rooms Open - last chance to see the displays

4:30pm **Topic 7: Wind up and conclusions - Ocean Suite**
Summary based on the work throughout the conference by the conclusions team: *Dace Ground, Turks & Caicos, UKOTCF (coordinator); Denise Dudgeon/ Joelene Foster, FCO; Sarita Francis, Montserrat National Trust and Permanent Secretary Montserrat Chief Minister's Dept; Mike Pienkowski, UKOTCF; Jack Ward, Bermuda Department of Conservation Services* - and discussion
Participants are encouraged to draw the attention of members of the team throughout the conference to points they think particularly important to include in the conclusions.

5:15pm Closing Remarks

5:30-6:30pm Conference Desk open/ Airport Departure Schedule for Thursday posted

6:30pm Taxis leave for Final Dinner – **Hotel Front Entrance**

7pm Reception - **Bermuda Aquarium, Museum and Zoo** (Sweater or jacket suggested)

7:45pm Dinner – **BAMZ**

10:30pm The Deep Night Club – **Elbow Beach Resort** (complimentary admission for conference delegates)

Thur 27 March Continental breakfast
Departures
For those leaving late in the day, there may be optional additional tours or informal meeting opportunities.

9am UKOTCF Executive Committee Meeting (committee members only) **Paget Suite**

Jay Warren, Pitcairn - delegate with the longest journey and with no scheduled means of transport for the first stages (FM). Below: the longboat, the main means of landing at Pitcairn, experiences a roughish day (FCO).

Appendix 2. Participants and their contact details

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Some of the members of the UKOTCF South Atlantic Working Group (above) and Wider Caribbean Working Group (below) get together at the conference

Appendix 3. Feedback

Collated by Frances Marks, UKOTCF

Introduction

Are conferences of this type of any use? By the time of the conference itself, the Forum Chairman was close to saying "never again", and tried to play devil's advocate in the discussions. But being a reasonable bloke, to try to secure a wider view, he encouraged a questionnaire - and various semi-formal and formal discussions ran through the conference. A summary of the results follows. It should be noted that the views summarised or quoted are not necessarily shared by the Forum or the other organisers and sponsors of the meeting.

A questionnaire "We need to hear from you!" was included in the conference pack, and participants were encouraged to return it with comments. Twenty-five people did so. This response of greater than 25% to a questionnaire is a good return rate, particularly in the light that the questions were open ended and respondents did not have much time to think about their comments. Respondents were invited to complete some or all sections as they wished, which resulted in a very wide range of comments. Below, the answers are summarised, using the structure of the original questions.

A number of other delegates contributed various comments either verbally or by email about the conference. There were also a number of comments relevant to this made in the Forum open joint session of its Working Groups. Wherever practicable, these comments have been incorporated in the analysis of the questionnaire below.

The preamble of the questionnaire was as follows:

"This conference has depended on a substantial amount of funding from the sponsoring bodies, the time (both paid and very largely volunteer) of organizers, and certainly not least the time and effort of all the participants. We are anxious to assess how useful this was and any lessons that can be learnt. We also want to capture any ideas that you have for future priorities for our joint efforts in relation to conservation in the UK Overseas Territories & Crown Dependencies and related countries. We would be grateful for your views. To help you in recalling aspects and to help us analyse the results, we have included some questions here, but do not feel the need to answer all of them, and please feel free to add any other points."

Below, each section of analysis starts with the original question (in bold). Note that, because questions were open-ended, reported percentages relate to the proportion of respondents commenting in a particular direction. Thus, for example, a report that 30% supported some view does not mean that 70% were against it; it simply means that 30% of people thought a point sufficiently important to comment on it. Where significant contrary views are expressed, these are reported too. The absence of contrary views reported implies that, to take the example above, the 30% represents a substantial consensus in favour.

1. Please indicate for any of the following sessions, any aspect that you found useful for your work (especially if you think that they will change how you approach aspects of it). Please indicate also any parts of the sessions that you thought of little value to you.

Topic 1 Conservation issues of Bermuda and conference initiation by field visit

On this topic delegates were unanimous about their praise and enjoyment of the day, finding it to be of great interest. 25% noted that it was an excellent icebreaker and good to have such a tour on the first day. It was felt to be the best way to experience first-hand the conservation issues facing Bermuda and brought home the realisation that many others' experiences are the same or similar – as are the challenges and issues of each Territory. This gave some hope to delegates. There was one comment: "Very useful for comparison with local issues in my own home. Perhaps a wider socio-cultural background would have enforced the day. It would have been nice to meet a wider range of people: teachers, volunteers etc." Several people noted the value of holding the field session on the first day, with the chance for participants both to get to know each other and the local issues.

Topic 2 Environment Charters and strategic planning

30% of respondents said that this group of presentations had been very useful and informative, especially how Bermuda had approached the production of its biodiversity plan. There was a comment that the session looked terrifying on the programme, with 14 presentations, but in fact had been interesting and gave some good project ideas.

An overall comment was that the calibre of presentations had been very high. One respondent felt that the 15-minute turn-over had been a little bit hectic, and 20-minute presentations with longer for questions might have been better, but it had kept things moving.

Having Bermuda Environment Minister, Hon Dennis Lester at the conference was considered important. It was mentioned by several that the FCO element was particularly useful, even if some aspects were not encouraging, but very good to have them at the conference. Participants remarked that this FCO commitment sadly contrasted with an absence of participants from Defra and DFID. Some noted that it would have been good to have had more representatives from UKOT governors' offices and also from more small island states, especially in the Caribbean/Pacific.

It was generally felt to be helpful to hear case studies, with several examples of "best practice" and useful to have overviews from UKOTs. There were some comments that it might have been useful to get more experience from implementing agencies in UKOTs on how easy or difficult it was to make progress in the Charter process. Given that there were several presentations on this, the comments may reflect the early stage of implementation in many places. There were comments suggesting more action and less planning, but that implementation of the Charters could help in this, and could be much more highly publicised.

From the Crown Dependencies point of view, the Environment Charters looks like an excellent initiative, and the Lord Chancellor's Department (which then led in HMG on Crown Dependency matters) should be encouraged to sign some sort of MOU with FCO on environmental issues.

Topic 3: Managing conservation organisations

This topic received mixed reaction. 20% reacted very favourably, with comments of "best plenary session", "excellent speakers", "good papers", "very useful in gaining ideas of successes", "extremely useful and relevant to the work I undertake". "Interesting to see the different challenges and perspective, especially pro's and con's of 'Eco-tourism' on Falklands". It was felt that there was a good cross section of experience from very small to large and complex.

Collaborating through the Forum's web/database and BVI National Parks Trust computerised report system were also considered to be useful by many.

On the other hand, 15% of respondents felt that the session had been less relevant, either because it was not in their line or they had felt the talks had not been focused. There were some comments that presentations were varied, but some rather off-topic, that this and Topic 4 overlapped, and that some presentations had even been a bit dry.

Even within the doubtful respondents, there was a general view that the topic had been useful. Two respondents suggested that perhaps a more informal experience-based discussion would have added to it, and there was a need for more open discussion of such issues. There was also a comment that there had not been enough, or any, input from organisational management specialists [although, as there were some of these present, it is possible that they were simply too restrained in comment!].

Topic 4: Implementing management plans

Two respondents had negative comments. These were: that, although interesting the session was more about management plans than implementation methods in a broader sense:and that the topic did not have relevance to one delegate.

However the remaining respondents who answered this question (75%) found this section of the programme extremely useful as well as being relevant to their work. David Stroud's efforts received several assessments of excellent. He, and one of the facilitators, Liz Charter, have collated some thoughts of possible further improvements and options for consideration in future exercises:

1. More time between workshops and report back is necessary to allow Rapporteurs to develop material and an overall summary pulled together. Although last week the Rapporteurs did magnificently, it was not really possible to do the second stage effec-

tively. Thus, Monday afternoon in the field and Wednesday morning report back would have been better (or even Tuesday am/ Wednesday am).

2. We had (and in also Gibraltar) a format of several groups looking at a range of sites. This spreads everyone a bit thinly. Other options (depending on one's objectives of course) are to have groups visiting several sites but focusing on one aspect of management planning at those e.g. just thinking about an Education/Awareness Plan for those sites. This would open subsequent report back to rather more of a compare/ contrast between sites highlighting different approaches to the same topic.

3. Alternatively, one could split groups thematically around one site – the thinking here might be to take a 'real' site and use the collective expertise to develop a real management plan - a sort of 'Visiting Group' approach. Thus one might have small groups variously considering invasive management, Education & Public Awareness, hydrological management, pollution issues etc all on the same site. This might take a little more setting up (preparation of background issues papers would be necessary) but would potentially have a more enduring impact on the individual site. Ideally, one would sort folk into groups prior to the field trip dependant on expertise, for example a month in advance. For this to work, one might need to know a little about skills/expertise gathered at the time of registration. Also it might take a little more set-up time initially and to benefit it might need a little post-conference time to ensure that conclusions were taken up locally. By definition the local site managers/government would need to be receptive to such an external review/appraisal of the management of the site chosen.

The plans were generally considered valuable, and could be transferable to other UKOTs. It was noted as especially good to hear success stories and challenges facing even "pristine" locations like Tristan; other useful examples listed were; a species action plan for the Ouvéa parakeet; Cayman iguana management plan and Ascension – focus on dealing with invasive species.

It was considered to be an excellent idea to include a genuine case study on the conference programme, although there was a comment that, as visitors, delegates probably had too little local knowledge to help much. [Although the main purpose of using these sites was to provide real sites for delegates to study, Bermuda colleagues have advised since that the results of the workshops are indeed of real value to them, having introduced new ideas, novel viewpoints and fresh analyses.]

There was a request for an example where mismanagement of good plans had occurred, whether financially or logistically, due to unforeseen eventualities, and how they could be dealt with, and the lessons learned.

Topic 5: Climate change

85% of respondents commented on this topic. 3 delegates found the topic less valuable than other sessions, but useful background, obviously a global issue but the three examples were of only tropical origin. [This was actually due to the planned Antarctic speaker, and another who would have addressed the temperate zone, pulling out at a late stage, and planned global overview also failing to materialise.] A further four delegates thought the topic depressing, although fascinating and even frightening. It was felt that there is a need to focus more on possible solutions rather than documentation of environmental degradation although possibly little could be done directly by UKOTs, or any organisation, other than being aware. There was one suggestion that the conference should have considered some action at the end. Two delegates found the topic interesting, even if negative, but that "science" had been diverged from conservation.

The remainder found the topic of interest, new to many participants. Presentations on BIOT and on the implications of global warming and sea level rise for nesting birds of Bermuda were commended particularly. Representatives from individual UKOTs noted that climate change was relevant to Cayman, especially with the heavy dependence on reefs for tourism; TCI had been provoked into more thought on the topic; and Anguilla requested literature to take away.

Points that could have received coverage included: Antarctic UK Territory; ice melt and temperature rises; impact on penguins; more on terrestrial

systems; alien release and DFID's report on climate change and the UKOTs which could have been made available at the conference. [See above: these subjects had been planned, but were withdrawn at a late stage; this is why this was a short session.]

Topic 6: Dealing with invasive species: sharing knowledge and experience

75% of respondents commented on this topic. The majority of these thought the session very useful, opening up ideas on how to approach this issue, providing a useful checklist and ideas of where to seek assistance. It was felt that most delegates had not realised this was such a big problem, but hearing other UKOTs' experience was very valuable and it provided ideas for projects.

On the negative side two delegates thought the session too long and frustrating, considering the group to be too large. It was suggested that delegates should have been broken up into working groups with a plenary report back

Oliver Cheesman and Annie Glasspool were commended for being able to make a comprehensive list from this proactive session. Individual comments received included: there was a need to study the cause and effect of invasive species; although there had been good discussion, the deeper ethical and philosophical issues were not addressed; and there was a lack of collective actions decided by the delegates.

Any other elements (e.g. displays, informal meetings etc)

50% of respondents said that there had been a good range of poster displays and informative handouts, with new ideas gleaned and others that could be transported. The bird box display with information on the evolution of the various shapes and structures was considered especially interesting. One UKOT noted that it may consider installing a few of the tropicbird nesting boxes.

One delegate requested a formal display session so that people not able to present in a main session could have a chance to interact more effectively. One delegated requested the there should be more flexibility in Q & A time.

Networking at this type of conference was considered paramount, informal meetings and discussion being always major benefits using plenty of long breaks, which are good for exchanging ideas. The stand-up breakfast and close proximity of all meals to the display areas were considered good opportunities to meet and chat.

Q2. The choice of session topics was the result of a wide consultation around those working in conservation in the UKOTs and similar areas as to which topic they would find most useful. We tried to accommodate as many as possible of these topics but could not include all of them. If another conference were organised, what topics would you like to see addressed?

Only two respondents did not answer this question, the majority of the rest had at least one suggestion for topics for future meetings, as well as expressing general contentment with the programme of this conference.

The topic to receive most mentions was fundraising, but the question was also raised as to whether this reflects the lack of funding sources available to UKOTs at least as much as a need to develop skills. It was suggested that a working session might be considered on how to access international donor funds, including a list of relevant donors, the projects they were likely to fund and tips on the kind of application. Also noted was the demystifying of complex major sources like EU (a long-term wish of many in the EU too, but it must be noted that, although several EU environment funds are in theory open to UKOTs, the reality may be different) and assessing the economic value of a good quality environment.

The second most mentioned topic dealt with media, education and awareness raising, either as a workshop or training session, to include more in-depth local issues particularly in respect of the socio-political economic aspects.

There were two suggestions regarding how to deal with Government local legislators, where these are reluctant and unresponsive, and working with government structures.

There were requests for more on marine issues, coastal planning and erosion issues, and terrestrial issues – which seems to cover most possibilities. A number suggested specific topics such as captive breeding and reintroduction programmes, creation of biological corridors, monitoring biodiversity,

sustainable tourism, EIAs, monitoring change, more actual management issues and more on invasive species. Whatever the topic it was felt that sessions should actually achieve something as a group and that the Forum could have a real sway when all together and that it should be developed further to even better effect.

The Forum working group chairpersons also requested that, in any future conference, there should be a dedicated session for members to meet.

One other general comment on Topics 2, 3 and 4 stated that, although of great interest, it was difficult to follow the threads of each topic; these would have been of more use if the topics had been more focused and directed.

Q3. Do you think that a conference of this nature is sufficiently useful so that another might be organised somewhere and, if so, after how many years' interval? Or do you think that the resources would be better deployed in another way (although it cannot be guaranteed, of course, that funds not used for a conference would actually be available for other conservation uses).

This question was answered by all respondents with the majority, 40% saying every 2 years and a further 30% saying between two and three years with a further 12% wanting a conference in three years time. No comments were against future conferences, despite serious - as well as jocular - testing of this!

There was a feeling that the gap between conferences should be long enough for progress to be made, but not to be too long to avoid loosing momentum. Typical comments included: nothing can replace meeting intensively, face to face; this is the best way: definitely worthwhile; and good opportunity to network, making contacts, learning about issues and progress in the UKOTs and sharing experiences.

There were a number of requests that there should be more workshop sessions, giving more time to structure thoughts in small groups. Maintaining the impetus between conferences, particularly continuing to lobby governments so that every UKOT is represented, and from government departments as well as NGOs, were also noted by some as important. It was also thought important that contact should be maintained in between conferences, possibly via the website.

Q4. What do you think should be the most helpful things that the UK Overseas Territories Conservation Forum should try to do to help its member organisations and other conservation partners (including governments) in the UK Overseas Territories

Responses to the question fell into a number of specific categories the main ones being: funding, the transfer of information, awareness raising and the continuation of liaison between the UKOTs and government.

Identification of funding sources was requested by 25% of respondents, including help in the bidding process and assistance in improving the ability of agencies to produce quality projects and help write proposals. A workshop or training on writing and preparing project proposals, as mentioned by several delegates, was also considered to be useful. Making more use by all of the interactive aspects of the website and increase the funding-relevant material on it was recommended. A thought was made that more members would increase Forum funding.

The Forum was seen to be already informing UKOTs of events, news and giving advice when requested. This should continue with a regular exchange of information between territories. Greater use should be made of information on the Forum's website, with a request on information on how to achieve compliance with international treaties.

There were many comments that information exchange could be developed even more through the website and database; members and other Forum collaborators were encouraged to use the database as a tool and to add it. Greater use should be made of information on the Forum's website. The website should be constantly updated; this could be done by the secretariat (if resourced a little more) as well as individuals in the UKOTs and member organisations. As at present, any comment should be attributed, or the source of the information should be recorded.

The discussion group facility could be an asset. Moderators for various subjects were needed, some volunteers had already been found. All the software

was in place; it just needs to be used.
This would help with the constant effort to raise UKOTs' profile in the UK, both with other NGOs and with Government, and could help bridge the gap between local and global aspects. It was also suggested that the Forum could help to coordinate universities, volunteers and science research with management needs in the UKOTs. Giving moral support and greater use of the Working Groups was seen as a useful activity for the Forum.

The UKOTCF Working Groups could help in a number of ways, the main areas discussed were: funding, information exchange including the website, raising awareness, capacity building and relationships with government.

The Forum was requested to continue the good work of representation and mediation between UKOTs and UK Government, liaising with the FCO and the relevant departments on environmental matters. Briefing of incoming Governors was seen to be useful as was the provision of advice to UKOT governments on environmental issues.

A better understanding and implementation of multilateral environmental agreements [MEAs – the term the government lawyers use for international environmental conventions] was requested. It was suggested that lobbying collectively would be more effective. Some thought that certain conference issues should have had signed resolutions, but there would be major technical difficulties with this. Other issues, including how to meet charter requirements and obtaining legislation for certain Territories, were also mentioned.

Forum News could be more widely distributed. A supply of *Forum News* and *Annual Reports* could be sent to the local NGO for distribution to the local councils.

One delegate wanted the Forum to "nag us to do more!"

Q5. What do you think should be the most helpful things that the British Government should try to do to help its member organisations and other conservation partners (including governments) in the UK Overseas Territories?

As in the previous question, funding mentioned by 60% of respondents was the top priority, particularly in the light of the Environment Fund for Overseas Territories being consolidated with global funds at FCO. It was felt that this could prove disastrous for the UKOTs, because it both appeared to signal an early lack of interest by HMG in the Environment Charters it had promoted, and because it abandoned the recognition that environmental conservation in the UKOTs is a shared responsibility fundamentally different from UK's help to foreign countries, with which the fund had now been combined. There were also practical difficulties when project proposals relating to the UKOTs and the Environment Charters are assessed by external advisers with little knowledge of these. There was a request that funds should be earmarked for the UKOTs, and also that the DFID fund for UKOTs promised in the 1999 White Paper should be initiated and well spent. Small communities had limited experience of the grant proposal process and help was needed. Government could provide help by resourcing suitable bodies and individuals from the UK to help the UKOTs alleviate the problems occurring from lack of manpower and resources. There was a request for a small grant programme for environmental emergencies and opportunities with minimal input and reporting needs as well as small easily accessed travel grants.

The FCO were commended on their delegation at the conference. However DFID was noticeable by its absence; also more support was needed from Defra. Government should be involved in the UKOTs in a joined up way. It was hoped also that FCO would influence by all practical means possible positive environmental policies within UKOT governments. There was a need for information sharing and better communication between government and the UKOTs with reassurance that UKOTs are part of UK.

Concern was expressed regarding the Environment Charters. Government was asked to act as a conduit, and/or to use the Forum as such a conduit, to collate the expressed needs of the Territories in terms of what they need to assist them to meet the Charter obligations (e.g. expertise, training, secondment as well as funds), and for the UK to assess how the Government and its agencies, as well as NGOs, might best provide assistance.

Greater influence was requested, through the Governors, to persuade UKOT Governments to take action as necessary on environmental issues, particularly to encourage local Governments to put

protected areas legislation in place.

Delegates from the Crown Dependencies requested similar help, for the Crown Dependencies.

Q6. What do you think that you will do differently as a result of attending this conference?

100% of those responding replied to this question, with respondents making at least one comment of what they would do and very few of the ideas were duplicated. Some were of a practical nature; such as: build bird-boxes or investigate the tropicbirds igloos for application in other UKOTs; actively promote the use of indigenous plants species instead of exotics; or progress Ramsar sites.

Several delegates mentioned that they intended adding data to the Forum's website as well as looking into the idea of a BVI-type database for tracking strategic planning objectives and progress. Other references to planning included the organisation of a management planning workshop and looking at ways to implement plans.

Using contacts that had been made at the conference was a frequent mention, with a view to increasing or developing informal networks and raising awareness of the UKOTs. Keeping a dialogue flowing with other UKOTs, tapping into various available resources and sharing expertise was also considered important.

There were a number of different references to funding, either exploring new ideas for funding and support or pursuing ideas for projects involving resources in all the UKOTs. There was a note of despair from Anguilla for more help.

There were several requests for assistance, for instance in finding information on how to produce a stamp issue for the UKOTs.

JNCC wished to understand how it could best support UKOT conservation and increase JNCC's involvement in supporting Government work with UKOTs and CDs.

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The Bahamas representative asked whether the idea of promoting a Commonwealth-wide version of the UKOTCF was possible. Having left the UKOT fold, Bahamas felt they could still benefit from an organisation like the Forum at the Commonwealth level.

Q7. Any other comments

Under this section a number of delegates congratulated the conference organisers for a superbly well organised and thoughtfully administered conference and thanked Bermuda for acting as hosts.

Comments of a negative nature included a reference to the consideration of serving shrimp as its production was considered to be unsustainable. [This is disputed by some.] Also there was a reference to the use of plastic water bottles and lack of vegetarian options. There were requests that the keynote speaker should be from the UKOTs, and that the keynote speaker at the next conference does not just preach to the converted.

Suggestions for improvement included: a request for small workshops; increasing discussion time; involving more people and giving the speakers more detailed instructions to help focus their talks on topics a bit more [although it has to be noted that some of these ideas were mutually exclusive]. Some noted that, at future meetings, a 2-hour slot should be allocated in the early afternoon for Working Groups to get together for a more or less formal meeting. Their meetings provide the only real opportunity for the Group's UK-based members to meet and discuss matters of mutual interest and concern with members and others in the UKOTs

A request of a practical nature was to publish a list of email addresses and contact details of all attendees on website [this was done for the previous conference, and is included for this one in these Proceedings]. A list of names in relation to the conference photo so that delegates could remember who was who was also requested. [The organisers are not averse to this idea, but could not achieve it for these proceedings without serious delay to their publication.]

Questions asked by several delegates was how far have UKOTCF and environment matters in UKOTs come since Gibraltar – were the same issues being raised or had tangible progress been made?

Appendix 4. Friends of the UK Overseas Territories

Friends
of the UK Overseas Territories

How does the Forum work to conserve the treasure trove of biodiversity found in the Overseas Territories?

- ü By supporting local people in their efforts to conserve their own environmental resources
- ü By helping non-governmental organisations (NGOs) find international funding for their work
- ü By providing strategic assistance to the Overseas Territories, both governments and NGOs
- ü By coordinating the support of UK member bodies in providing specialised technical assistance to enable local people to carry out conservation projects
- ü By raising awareness in the UK about the Overseas Territories and our responsibility to them
- ü By providing regional support by expert Working Groups
- ü By representing NGOs on international bodies such as the Ramsar Committee

The Forum supports local organisations because they create a sense of ownership of the resources to be protected and they create pride in the local people in their own national treasures. They are the most effective environmental educators, and unlike international bodies, they will always be there. That's why the Forum concentrates on empowering local people and giving them the tools and information they need to do the work themselves.

Four good reasons to become a Friend

1. You know how valuable and vulnerable are the environmental treasures held in the Overseas Territories.
2. You understand that the only way to guarantee their protection is to build local institutions and create environmental awareness in the countries where they are found.
3. You care about what is happening in the Overseas Territories and want to be kept up to date by regular copies of *Forum News* and the Forum's *Annual Report*.
4. You understand that the Overseas Territories are part of Britain, and therefore are not eligible for most international grant sources - but neither are they eligible for most domestic British ones, so help with fundraising is essential.

I wish to become a Friend of the Overseas Territories at the following support level: ☐ £15 ☐ £50 ☐ £100 ☐ £500

I wish my company to become a Corporate Friend at the following support level: ☐ £150 ☐ £500 ☐ £1,000 ☐ £5,000

_____
Name of individual Friend or contact person for Corporate Friend

_____
Company name for Corporate Friend

Address_____

_____

_____

Tel _____Fax _____

E-mail_____

Signature_____Date_____

Friends subscriptions can now be paid by credit/debit card as well as by UK cheque.

This means that payments from various countries can be made easily; your card company will handle the exchange and include the equivalent in your own currency in your regular statement.

Either: ☐ I enclose my cheque made out to UKOTCF for the amount indicated above

Or: Please charge the amount indicated above to my card:

☐ American Express ☐ Delta ☐ JCB

☐ MasterCard ☐ Solo ☐ Switch ☐ Visa

Card Number ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry date: ☐☐ / ☐☐ (month/year)

If used: Valid from ☐☐ / ☐☐ Issue number _____

Send to: UKOTCF, 15 Insall Road, Chipping Norton, Oxon OX7 5LF, UK