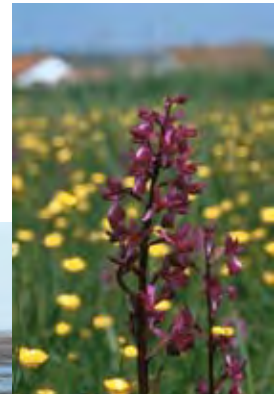


# Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities

**Jersey 6th -12th October 2006**

Edited by Dr Mike Pienkowski  
UK Overseas Territories Conservation Forum  
September 2007

© UKOTCF 2007



**Organised by:**

**UK Overseas Territories Conservation Forum, with the support of the Overseas Territories Environment Programme, and hosted by the Jersey conservation bodies**



# **Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th-12th October 2006 - Introduction**

Organised by:

**UK Overseas Territories Conservation Forum, with the support of the Overseas Territories Environment Programme, and hosted by the Jersey conservation bodies**



## **Background**

Jersey hosted an international environment conference from 6th to 12th October 2006, with a focus on UK Overseas Territories, Crown Dependencies and other small islands.

The conference was organized by the UK Overseas Territories Conservation Forum, in consultation with the Environmental Department of the States [Government] of Jersey, the Société Jersiaise, the National Trust for Jersey and the Durrell Wildlife Conservation Trust. It was supported by the Overseas Territories Environment Programme of the UK Foreign and Commonwealth Office and Department for International Development. It was the fourth such conference following the first held in London in 1999, and the second in Gibraltar in 2000 and the third in Bermuda in March 2003. The proceedings of both the Gibraltar and Bermuda conferences can be seen at [www.ukotcf.org](http://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 so that Overseas Territories, Crown Dependencies and other small island communities which share similar environmental problems would benefit from each other's experiences and history of planning and conservation initiatives, as well as from holding the conference in Jersey.

The main topics had been determined after wide consultations amongst conservationists working in

the Overseas Territories and Crown Dependencies. Main sessions were:

- Environmental education and the UKOTs
- Environmental Charters and strategic planning
- Integration of conservation and sustainable livelihoods
  - Terrestrial
  - Marine, including fisheries
- Obtaining and Using Resources (not just money)
- Species conservation issues:
  - Dealing with alien invasive species
  - Species recovery including captive breeding

To take advantage of the bringing together of persons with these interests, two optional additional workshops were held before and after the main conference:

- Before the main conference, a 2-day workshop on Biodiversity and Impact Assessment in Small Island States, on Friday 6th and Saturday 7th October, organised by the International Association for Impact Assessment.
- After the main conference, a 1-day workshop on bird monitoring, on Thursday 12th October, organised by the RSPB.

The conference was held at Hotel L'Horizon, St Brelade, Jersey. The final published programme is at Appendix 1, but further modifications and refinements to this were made during the conference to meet needs and late constraints.

## 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 constitute 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.

The organisers are grateful for contributions to the funding and other support of the conference from:  
The Overseas Territories Environment Programme  
of the UK Foreign and Commonwealth Office  
and the Department for International Development

UK Overseas Territories Conservation Forum  
The Environmental Department of the States of Jersey  
The Société Jersiaise  
The National Trust for Jersey

The Durrell Wildlife Conservation Trust  
IAIA (International Association for Impact Assessment) 'Capacity Building for Biodiversity and Impact Assessment Project' (CBBIA), funded by the Netherlands Government

Royal Society for the Protection of Birds  
The Commonwealth Foundation

The UK Overseas Territories Conservation Forum organised the conference, and would like to thank particularly Mike Pienkowski (Chairman, UKOTCF) and Mike Freeman (Principal Ecologist, States of Jersey) for taking the lead (as well as much of the work) in making the conference happen. These were supported by the stalwart work in taking bookings, organising flights, liaising with participants and organising posters, amongst many other tasks, of the Forum Co-ordinator, Frances Marks. Ann Pienkowski valiantly stepped in to do additional organising work before, during and after the conference, including the preparation of the Conference Handbook and badges.

We are all grateful to the staff of Hotel L'Horizon for doing so much to make things run smoothly, and coping magnificently with our requests which could change at very short notice. The team from Delta dealt with audio-visual needs very professionally. We are grateful to the the States



of Jersey and the team from its Environment Department for the loan, delivery, erection and removal of a large quantity of display boards. The coach drivers and management team from Tantivy made sure that participants reached the venue efficiently, caught their flights home and travelled efficiently to the off-site venues. We are grateful too to the team of volunteers from the Environmental Department of the States of Jersey, the Société Jersiaise and the National Trust for Jersey who helped with the logistics of set-up, registration and conference desk, advice, guidance and the endless small tasks which a conference needs to run smoothly. We thank also Zoe Bouteloup of the Tourist Board for leaflets for the conference packs and Gary Grimshaw for the group photograph.

The conference was grateful for the generous welcomes from the Bailiff of Jersey, Sir Philip Bailhache, and Senator Stuart Syvret, Minister for Health and Social Services. These got the conference off to an excellent start, as did the superb 2-day pre-conference workshop on Environmental Impact Assessment, attended by about half the main conference participants. We are grateful to International Association for Impact Assessment and facilitators Dr Jo Treweek, Dr Bill Phillips and Jeremy Barker for organising this.

The main conference benefitted greatly from the walk on the seabed at extreme low-water of an exceptional spring tide, led (and carefully followed!) so ably by Andrew Syvret and his small team of experienced guides. Not only did this allow visitors to experience the remarkable natural feature of its tidal range of up to 40 feet (13 m), but also had the chance to get to know each other in informal discussions, thereby promoting progress in the following conference sessions.

One of the most thankless jobs in any conference is to try to keep track of the discussions and conclusions, as well as providing notes to help session organisers and authors take account of points made in revising their texts. We are grateful again to Dace Ground for taking the lead in this, and roping in others to take notes and provide advice. These helpers included Joseph Smith Abbott, Ann Pienkowski, Jennifer Gray, Lynda Varlack, Dick Beales, Bryan Naqqi Manco, Mike Freeman and Mike Pienkowski, with apologies to others inadvertently omitted from this list.

We are grateful to the session organisers for

putting their programmes together and running them, and their collaborators and rapporteurs. In this context, we note thanks especially to those session organisers who took on these roles (or greatly expanded them) when others who had originally undertaken to do so had to restrict or end their roles. Those providing extra help in this way were Dr John Cooper, Dr Oliver Cheesman, Nigel Crocker and Ann Pienkowski. The last named took on, at very short notice, the novel idea of organising the involvement of a number of local students in the conference. Participants in the conference were unanimous in commending the success in this, and in thanking the students themselves, Ann, Mike Freeman, and the schools, colleges and teachers, particularly Jo Moss (Jersey College for Girls) and Dr Steve Appleyard (Victoria College).

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 UKOTCF member organisations, local administrations, and others, for the work on which these presentations are based.

Sanity was restored mid-conference by a break from the intensive sessions, in the welcome form of a “Vin d’Honneur” hosted by the National Trust for Jersey at their Historic Farm at Hamptonne. This gave participants the chance both to view the farm and its traditional operations as well as have many informal working discussions over fine local food and drink.

Our main conference (not forgetting the smaller number of hard-core bird people staying on for RSPB’s one-day workshop) came to a fine conclusion with the final session at Durrell Wildlife Conservation Trust. We thank all the staff there for making us so welcome. The afternoon and evening session included a series of presentations on species recovery work, centering on the UK Overseas Territories, a walk around the live exhibits with the opportunity for further informal discussions, and an excellent closing dinner in the Dodo Restaurant.

At the last, we were honoured with the presence of Lee Durrell. In her entertaining and stimulating remarks to close the conference, we were delighted



to learn that she had just noticed while dealing with a publication matter that the event coincided with the 50th anniversary of the publication of her late husband's classic book *My Family and Other Animals*. As UKOTCF's Chairman noted in his thanks, for many of us, this and Gerald Durrell's other books were key in stimulating our initial interest in wildlife and conservation.

## 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. Unless authors opted otherwise, the illustrations from their conference presentations have been used to illustrate their papers in these Proceedings. In rather too many 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, nor to have all the illustrations at the standard that we would have preferred.

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 cases where the authors have been able to supply at least part of their contributions, these have been included.

Versions of poster papers have been included where authors have supplied these. The format used for these has depended on practicability. They have been placed in the most appropriate sections.

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 (although, because of the reasons noted above, not as quickly as we would have liked), so that they can serve as aide-memoires for participants as well as to respond to the



*Conference participants*

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).

Given the widely dispersed nature of users (as well as economy), we decided again on publication on the internet. Even despite using very efficient software, there are compromises between image quality 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 Ann Pienkowski and Dr Oliver Cheesman for additionally checking and editing of some parts.

## Copyright and photo credits

These Proceedings are the copyright of the UK Overseas Territories Conservation Forum. However, the Forum authorises the copying of the electronic version and printing of copies, in both cases for non-commercial use. Use of extracts should acknowledge the source.

Photographs are the copyright of the photographers. The use of them separately from the Proceedings or from articles within these is not authorised. Unless otherwise indicated, photographs within articles were supplied by authors, and photographers should be contacted via those authors. The photographers of other pictures are by:

Frances Marks,  
Dr Mike Pienkowski,  
Dr Oliver Cheesman,  
Ann Pienkowski.

Front cover pictures of red starfish, loose-flowered or Jersey orchid, St Ouen's Bay and Les Mielles, and Seymour Tower across the tidal flats from Icho Tower, by Andrew Syvret, Mike Freeman & Mike Pienkowski



*Conference venue: Hotel L'Horizon, St Brelade's Bay*

# Contents

<b>Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th-12th October 2006 - Introduction .....</b>	<b>2</b>
Background .....	2
Acknowledgements .....	3
Editor's Preface .....	5
Contents .....	7
Conference overview and initial conclusions .....	13
<b>Topic 1: Opening of Conference and Conservation issues of Jersey .....</b>	<b>21</b>
Introduction to the Conference by the Chairman of the UK Overseas Territories Conservation Forum ....	22
Dr Mike Pienkowski	
Opening of the Conference .....	24
Sir Philip Bailhache, Bailiff of Jersey	
Welcoming Address on behalf of the Government of Jersey .....	26
Senator Stuart Syvret, Minister for Health and Social Services	
Jersey: Environmental Challenges and Achievements .....	28
Mike Freeman, Principal Ecologist States of Jersey, Environment Department	
Jersey's Marine Environment .....	38
Andrew Syvret, Société Jersiaise	
<b>Topic 2: Conservation of the Built Heritage in the UK Overseas Territories .....</b>	<b>45</b>
A Future for Historic Buildings in the UK Overseas Territories .....	46
Martin Drury, formerly Director-General of the National Trust, and former UKOTCF Council Member	
Poster: St Helena Historic Houses and Sites: What Future?.....	50
Cathy Hopkins, St Helena National Trust	
<b>Topic 3: Environment Charters and strategic planning .....</b>	<b>53</b>
Session Organiser: Dr Mike Pienkowski, Chairman, UK Overseas Territories Conservation Forum	
Review of the progress of implementation of the Charters, based on current work to develop a system to monitor this .....	54
Dr Mike Pienkowski, UKOTCF	
Turks & Caicos Islands and the implementation of the model Environment Charter strategy .....	73
Michelle Fulford-Gardiner, Deputy Director, Department of Environment & Coastal Resources, Turks & Caicos Islands	
St Helena and the application of the pilot model for strategy development .....	74
Cathy Hopkins, Director, St Helena National Trust; and formerly Chair of St Helena Environment Advisory Consultative Forum	
The implementation of the Environment Charter in the Falkland Islands .....	77
Dominique Giudicelli, Environmental Planning Officer, Falkland Islands Government	
Collaborating with the Organisation of Eastern Caribbean States Model towards Environment Charter Implementation: Anguilla's Approach .....	82
Karim Hodge, Anguilla Director of Environment	
Bermuda's biodiversity strategy implementation and its Environment Charter .....	86
Jennifer Gray, Bermuda Conservation Service, Bermuda Zoological Society & Bermuda Audubon Society	
Tristan da Cunha Biodiversity Action Plan 2006-2010 .....	91
Simon Glass, Conservation Officer, Tristan da Cunha	
An approach to strategic environmental planning in a Crown Dependency .....	93
Roland Gauvain, Alderney Wildlife Trust	
Multilateral Environmental Agreements and UKOTs/CDs - a need for more guidance? .....	95
Elizabeth Charter, Head of Isle of Man Wildlife & Conservation Division	
Poster: Pitcairn Islands Environmental Management Plan .....	98
Noeleen Smyth, Steve Waldren, Jim Martin, Botanical, Environmental & Conservation Consultants and Naomi Kingston, National Parks and Wildlife Service, Republic of Ireland	

Fulfilling HMG commitments - Foreign and Commonwealth Office .....	100
Helen Nellthorp, Deputy Head of Overseas Territories Department, and Shaun Earl, Overseas Territories Environment Programme Manager, OTD, Foreign & Commonwealth Office	
Fulfilling HMG commitments - Department for International Development.....	101
Phil Mason, Head of Overseas Territories Department, and Dick Beales, Senior Natural Resources & Environment Adviser, Department for International Development	
Fulfilling HMG commitments - Department of Environment, Food & Rural Affairs .....	103
Eric Blencowe, Head Zoos & International Species Conservation, Department of Environment, Food & Rural Affairs	
Fulfilling HMG commitments - JNCC's involvement in supporting implementation of Environment Charters in the Overseas Territories .....	105
Marcus Yeo, Director Resources & External Affairs, and Dr Vin Fleming, Head - International Unit / CITES Scientific Authority (Fauna), Joint Nature Conservation Committee	
Discussion .....	107
<b>Topic 4: Integration of conservation and sustainable livelihoods: Marine, including fisheries .....</b>	<b>109</b>
Session Organiser: Dr John Cooper, Chief Research Officer, Avian Demography Unit, Department of Statistical Sciences, University of Cape Town, South Africa, and an Honorary Conservation Officer, Tristan da Cunha	
Introduction by session co-ordinator .....	109
Dr John Cooper, Chief Research Officer, Avian Demography Unit, Department of Statistical Sciences, University of Cape Town, South Africa, and an Honorary Conservation Officer, Tristan da Cunha	
Review 1: By-catch issues in fisheries within UK Overseas Territories in the South Atlantic, with special reference to the Falkland Islands .....	112
Grant Munro, Falklands Conservation	
Review 2: Development issues in the inshore marine zones of UK Overseas Territories and Crown Dependencies.....	122
Dr Annie Glasspool, Bermuda Zoological Society	
Review 3: Marine Protected Areas in territorial and EEZ waters of UK Overseas Territories and Crown Dependencies: useful tools in the box? .....	134
Dr Mike Brooke, Department of Zoology, University of Cambridge, and Chairman UKOTCF Pitcairn WG	
Discussion following the review presentations.....	138
Poster: Assessment & Improved Management of New and Existing Marine Protected Areas in the British Virgin Islands .....	140
Joseph Smith Abbott, British Virgin Islands National Parks Trust	
Poster: The British Virgin Islands Marine Conservation Programme .....	141
Nancy K Woodfield Pascoe, British Virgin Islands National Parks Trust	
Poster: Environmental Impact Assessment and Tidal Power; filling the legislative vacuum: A case study from Alderney (Bailiwick of Guernsey) .....	142
Roland Gauvain, Alderney Wildlife Trust	
Poster: Bermuda Reef Ecosystem Assessment and Mapping (BREAM) Programme 2006 .....	143
Thaddeus J.T. Murdoch, Anne F. Glasspool, Mark Outerbridge, J. Clee, C. Lustic, A. Wanklyn, A. Batson, Mike Colella, G. Toro Farmer and E. Salas, Bermuda Zoological Society	
Poster: Assessing the conservation status of the critically threatened Spectacled Petrel .....	145
Contact: Geoff Hilton, RSPB	
<b>Topic 5: Integration of conservation and sustainable livelihoods: Terrestrial .....</b>	<b>147</b>
Session Organiser: Dr Oliver Cheesman, UKOTCF Council	
Integration of Conservation and Sustainable Livelihoods: Terrestrial – Introduction, Overview and Conclusions .....	147
Dr Oliver Cheesman, UKOTCF Council	
Managing the impact of tourism: lessons from South Georgia .....	150
Gordon M. Liddle, Operations Manager, Government of South Georgia and the South Sandwich Islands	
Building the TCI Biodiversity Management Plan with the local community and putting it into practice:	



surveying biodiversity, designing trails, recruiting guides, encouraging crafts .....	154
Bryan Naqqi Manco, Senior Conservation Officer, Turks & Caicos National Trust	
Environmental considerations in the planning of an airport for St Helena: getting the balance right ....	169
Dick Beales, Senior Natural Resources & Environment Adviser DFID (prepared with Isabel Peters, Environmental Co-ordinator, St Helena Government)	
Terrestrial biodiversity conservation in Mauritius and Rodrigues: the upscaling and mainstreaming challenge .....	178
John Mauremootoo, CAB International, formerly Mauritius Wildlife Foundation	
<b>Topic 6: Dealing with alien invasive species .....</b>	<b>193</b>
Session Organisers: Dr Colin Clubbe (Royal Botanic Gardens Kew & Vice-Chairman UKOTCF) and Dr Oliver Cheesman (UKOTCF Council)	
Dealing with Alien Invasive Species – Introduction, Overview and Conclusions .....	193
Oliver Cheesman, UKOTCF Council, and Colin Clubbe, Royal Botanic Gardens Kew & Vice-Chairman UKOTCF	
Non-native species in the UK Overseas Territories and Crown Dependencies: outcome of a review ..	201
Karen Varnham, Invasive Species Consultant, and Vin Fleming, Joint Nature Conservation Committee, UK	
Non-native species – Current Great Britain Perspectives .....	204
Niall Moore, Non-native species Secretariat, CSL	
Initiative on Invasive Alien Species in the French Overseas Territories .....	206
Jean-Philippe Palasi, IUCN Office for Europe and Yohann Soubeyran, IUCN French Committee	
Turks and Caicos Islands Invasive Pine Scale .....	208
Martin Hamilton, Royal Botanic Gardens, Kew	
The Repercussions of Hurricane Ivan for Invasive Species in Grand Cayman, Cayman Islands .....	214
Dr Mat Cottam, Cayman Islands Department of the Environment	
Intervention strategies in pest control.....	218
John Parkes, Landcare Research	
Poster: Invasive species management on islands; raising awareness, generating support, building capacity. 220	
John Parkes, Landcare Research	
Working for Water (South Africa) – the Biggest Invasive Alien Species Management Programme in the Developing World.....	221
John Mauremootoo, CABI Africa	
Poster: An assessment of the potential for rodent eradication in the Tristan da Cunha Islands Group .....	226
Geoff Hilton, RSPB	
Poster: An experimental assessment of the impact of rats on the biodiversity of the Centre Hills, Montserrat .....	229
Geoff Hilton, RSPB	
Poster: Ascension Island Seabird Restoration Project .....	231
Tara Pelembe, Raymond Benjamin and Anselmo Pelembe, Ascension Island Government Conservation Office	
Poster: Spatial and temporal patterns of seabird recolonisation of mainland Ascension following cat eradication.....	234
Tara Pelembe, Ascension Island Government Conservation Office, Norman Ratcliffe, RSPB, Mike Bell, Wildlife Management International Ltd, Richard White, Ascension Island Government Conservation Office, and Sarah Sanders, RSPB	
Poster: Invasive species and their impact on the Wirebird .....	235
Cathy Hopkins and Gavin Ellick, St Helena National Trust	
Poster: Invasive species control ( <i>Roseapple Syzygium jambos</i> ) and restoration of the threatened native flora of Pitcairn Island, South Central Pacific Ocean .....	237
Noeleen Smyth, Steve Waldren, Trinity College, Dublin, Naomi Kingston, National Parks and Wildlife Service, Jay & Carol Warren, Pitcairn Island	
Poster: Invasive Alien Species in Bermuda – The Current Situation .....	238

Anne F. Glasspool, W. Sterrer, Bermuda Zoological Society, and J.A. Ward, Department of Conservation Services, Bermuda	
Poster: Eradicating New Zealand flax <i>Phormium tenax</i> at Tristan da Cunha .....	243
Peter Ryan, Sarah Sanders, James Glass & Simon Glass	
Poster: Alien plant invades Montserrat .....	244
S. Barrios, M. Hamilton and C. Clubbe	
<b>Topic 7: Obtaining and using resources (not just money) .....</b>	<b>245</b>
Session Organiser: Nigel Crocker (UKOTCF Treasurer)	
Resources for conservation and sustainable development in ORs and OCTs : integration in European strategies for Conservation and Research? .....	246
Philippe Feldman, Cirad, and Josiane Irissin-Managata, Réunion Regional Council	
Obtaining resources for conservation: a Dutch Caribbean perspective .....	249
Kalli De Meyer, Dutch Caribbean Nature Alliance	
Bioverseas: Initiative for biodiversity and environment in EU ORs and OCTs .....	253
Jean-Philippe Palasi, IUCN, Europe Regional Office	
Discussion .....	258
The Blue Iguana Recovery Programme .....	259
Fred Burton, Blue Iguana Recovery Programme	
Support through volunteers .....	263
John Cortes, Gibraltar Ornithological & Natural History Society	
RSPB's Sabbatical Programme .....	269
Sarah Sanders, RSPB	
Capacity Building at the Royal Botanic Gardens Kew .....	270
Colin Clubbe, Royal Botanic Gardens, Kew	
Major Project Needs Requiring Resources both Financial and Non-Financial – a framework .....	272
Nigel Crocker, UK Overseas Territories Conservation Forum	
<b>Topic 8: Environmental Education and the UKOTs .....</b>	<b>283</b>
Session Organisers: Ann Pienkowski (teacher & conservationist) and Dr Juliet Rose (UKOTCF Council, and the Eden Project)	
Good Practice for environmental education projects in the UK Overseas Territories: a draft paper for consideration by participants .....	284
Ann Pienkowski (teacher & conservationist) and Dr Juliet Rose (UKOTCF Council, and the Eden Project)	
British Virgin Islands Environmental CD Atlas and Teaching Resource .....	289
Nancy K. Woodfield-Pascoe, British Virgin Islands National Parks Trust, Mark Hayward, BVI Conservation and Fisheries Department, and Bob McKay, Dougal Thornton Associates	
High Schools Native Plant Nursery Project in the Turks & Caicos Islands .....	295
Ethlyn Gibbs Williams and Bryan Naqqi Manco, Turks and Caicos National Trust	
Jersey Environment Week .....	297
John McGuinness, Deputy Headteacher, Le Rocquier School and Jersey Ecology Fund Trustee	
Environmental Education Programme (including education packs) for the Falkland Islands and Ascension Island .....	302
Ali Liddle & Grant Munro, Falklands Conservation and Tara Pelembe, Conservation Centre, Ascension Island	
Recommendations from the Environmental Education Session .....	310
Lynda Varlack, Ann Pienkowski and Juliet Rose	
Student impressions of the Conference .....	312
Alain Baudains, Samantha Cropper, Katie Mason, Gemma Parlett, Sophie Pickup, Alex Pinel, Piers Sangan, Aimée Vibert and Emma Voak	
<b>Topic 9: Species recovery including captive breeding .....</b>	<b>317</b>
Session Organiser: Dr John Fa, Director of Conservation Services, Durrell Wildlife Conservation Trust	
Biodiversity assessment of the Centre Hills, Montserrat .....	318
Richard Young, Durrell Wildlife Conservation Trust	
Poster: Captive Breeding for Conservation in Bermuda .....	327

Samia Sarkis, Department of Conservation Services, Bermuda	
Poster: Bermuda Protected Species Programme.....	329
Samia Sarkis, Department of Conservation Services, Bermuda	
<b>Topic 10: Posters and other items on other topics.....</b>	<b>331</b>
Poster: BVI National Parks Trust.....	332
Joseph Smith Abbott and Nancy K. Woodfield-Pascoe, British Virgin Islands National Parks Trust	
Poster: Anegada Vegetation Habitat Mapping .....	333
Nancy K. Woodfield-Pascoe and Joseph Smith Abbott, British Virgin Islands National Parks Trust	
Poster: Development and population of a dynamic, map-based, interactive Bermuda biodiversity web portal for island-wide and global information dissemination .....	334
A.F. Glasspool, J.A. Ward, W. Sterrer , M. Outerbridge and T.J. Murdoch, Bermuda Zoological Society and Department of Conservation Services, Bermuda	
Poster: Distribution, population assessments and annual reproductive cycles of Bermuda's endemic killifishes .....	337
Mark Outerbridge, John Davenport and Anne F. Glasspool, Bermuda Zoological Society, and Department of Zoology, Ecology & Plant Science, University College Cork, Ireland	
Poster: Sustainability and the Ecosystem Approach.....	340
Diana Mortimer, Joint Nature Conservation Committee	
Poster: Valuation and other economic tools for the Overseas Territories .....	341
Emily McKenzie, Joint Nature Conservation Committee	
Poster: Fragments of Paradise: Promoting Biodiversity Conservation in the UKOTs .....	342
UK Overseas Territories Conservation Forum	
Poster: UK Overseas Territories Programme: current projects, activities and collaborations.....	343
Royal Botanic Gardens, Kew	
Book launch: Important Bird Areas in the UK Overseas Territories .....	351
Sarah Sanders and Geoff Hilton, RSPB	
<b>Appendix 1: Workshop on Biodiversity and Impact Assessment in Small Island States .....</b>	<b>353</b>
Facilitators: Dr Jo Treweek (Technical Programme Manager for a 'Capacity Building for Biodiversity and Impact Assessment' project), Dr Bill Phillips (Director of MainStream Environmental Consulting and the former Deputy Secretary General of the Ramsar Conv	
Introduction to Workshop .....	354
CBBIA-IAIA: Promoting biodiversity-inclusive impact assessment.....	354
Biodiversity and Impact Assessment in Small Islands .....	356
The Ramsar Convention on Wetlands and Impact Assessment .....	361
Environmental Impact Assessment process: general stages .....	366
Valuing biodiversity for impact assessment.....	371
Approaches to mitigation of biodiversity-related impacts.....	373
Environmental Impact assessment in the Marshall Islands .....	377
<b>Appendix 2. Final published programme for the conference .....</b>	<b>379</b>
<b>Appendix 3. Participants and their contact details.....</b>	<b>390</b>
<b>Appendix 4. Feedback from participants .....</b>	<b>399</b>
Based on a collation by Frances Marks, UKOTCF	
<b>Appendix 5. Friends of the UK Overseas Territories .....</b>	<b>404</b>



*The conference venue; above: the pleasant world at low-water outside; below: at work inside*





# Conference overview and initial 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 (Bermuda National Trust and UKOTCF Council), with the help of: Joseph Smith Abbott (BVI National Parks Trust), Mike Freeman (States of Jersey Environment Department), Mike Pienkowski (UKOTCF Council), Dick Beales (Department for International Development), Ann Pienkowski (UKOTCF volunteer), Jennifer Gray (Bermuda Government) and session chairpersons and rapporteurs. 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. The version given below incorporates additional points made in the following discussion.*

*The overview and initial conclusions, gathered together here in these Proceedings, were previously published on the UKOTCF website shortly after the conference. Together with these, then and here, are the Statement and recommendations from the workshop "Biodiversity and impact assessment in Small Island States" 6-7 October 2006, Jersey. These were presented to the main conference which incorporated them into its conclusions.*

## Introduction and Jersey

We began our conference, as we always do, with an in depth introduction to our host island.

The Bailiff of Jersey, Sir Philip Bailhache, graciously opened the meeting with a warm welcome and some very helpful words of support for our joint enterprise. He began our introduction to Jersey with a review of the constitutional position of the Crown Dependencies, something many from the Overseas Territories were learning

for the first time. We also had some very thoughtful words from the Minister for Health & Social Services, Stuart Syvret, about the great complexity of the interaction between the needs of human society and of environmental protection.

Mike Freeman, Jersey's Principal Ecologist, briefed us on the history of conservation in recent times, and on the 2005 report into the 'State of Jersey' in which they assessed conservation issues from the global right down to the minutely local and even species-level. They used the pressure, state, response mechanism for developing indicators, and monitor some 40 environmental indicators, chosen through a consultative process and using volunteers to do the actual monitoring in many cases.

Through this process, five key environmental priorities were identified:

- Climate change
- High waste generation
- Sufficient clean water resources - regulating and understanding groundwater consumption
- Transport - reduction of reliance on cars.
- Countryside and natural history

They are working now on a strategic plan for the next five years.

All in all, environmental awareness has grown greatly in Jersey over the last 20 years, helped by MEAs such as the Ramsar Convention on Wetlands. As we learned later in the Education Session, this environmental awareness is also being brought into the schools through a new and very ambitious annual Environment Week.

We then had an introduction to the Jersey marine environment from Andrew Syvret. All of us who were at the Bermuda meeting remember him as the graduate student who kept an ormer in his dormitory room, feeding it spinach, to help with homesickness, so we were all looking forward to more time with Andrew. We learned that Jersey was attached to the mainland of France as recently as 5000 years ago and a great deal about the tides, the marine life and the conservation issues Jersey faces and which they 'don't tell the tourists about', including a nuclear reprocessing plant in the neighbourhood.

Then Andrew took us on a walk unlike anything most of us have ever done. Walking on Jersey's seabed with the underwater landscape exposed was an amazing and a fantastic introduction to our host country.

So thus welcomed, introduced and then (nearly literally) immersed into the amazing Jersey landscape, we turn to the conference itself.

I loved the question from the journalist at the end of the first Environment Charter session. He asked if all our effort -- and all this bureaucracy -- actually result in our actually saving anything. Got right to the point, I thought, so I thought I might start this review with just a few examples of what the people in this room have actually been working to save:

- Blue iguanas in Grand Cayman; the most important seabird colonies in the mid-Atlantic, the Mauritius Kestrel, the Montserrat Oriole
- Critical habitat for the wirebird, penguin colonies and some of the most remarkable wetlands in the world
- Albatross, sea-turtles and dolphins which would otherwise become bycatch
- And all the less charismatic species who take refuge in the protection we create for their flagship brothers

The other thing I think we all love in these meetings is getting detailed descriptions of projects other people have done – the degree of creativity, ingenuity, perseverance and passion the people in this room bring to our joint enterprise is inspiring for all of us, and serves as a pretty convincing response to questioning journalists.

We learned about:

- An amazing programme to preserve historic structures that would be slated for destruction without a creative business model that saves the buildings, restores them with great sensitivity and creates jobs for the people who live near them.
- The development of a sustainable low-impact ecotourism programme that both preserves a traditional community and protects one of the most important wetlands in the Caribbean
- The conversion of a hillside in Gibraltar from post-industrial wreck to beautifully re-established native habitat, all done with no money, just influence
- A programme to control invasive plant species in South Africa which has been 'mainstreamed'

as a water resources protection programme, and which has total financial and political commitment behind it.

- Projects to control invasions by animals ranging from rats to reindeer, including pigs, rabbits, goats, green iguanas and the specially horrible pine scale insect, and plants from casuarinas to giant escaped office plants.

But questioning journalists notwithstanding, we all know that it takes an incredible amount of work in the background to make these on-the-ground projects happen. And that's the real work of meetings like these. We worked on:

- environmental impact assessment techniques
- the complex subject of biosecurity and invasive species
- Environment Charter implementation
- balancing development with sustainability
- environmental education (without which all the rest of this is pointless) and
- we returned over and over again to the constant issue of finding the resources needed to carry out all of this vital work.

## **Environmental Impact Assessments**

The workshop on biodiversity and impact assessment was, by all accounts, a great success and a memorable experience for those who participated. They worked through a daunting list of challenges and came up with a set of recommendations (appended) to improve capacity and develop the tools needed to produce effective environmental impact assessments and strategic environmental assessments in the UKOTs and the CDs.

Listening to the report from the workshop made some of us feel wistful hearing about these fantastic techniques when some of our governments routinely refuse to do meaningful – or in many cases ANY – environmental review before huge projects are approved. It was recognised that this may be an issue for HMG to consider with regard to their good governance reviews, and we hope this will be followed up in future.

## **Invasive species**

This was an issue which really came out in the Bermuda conference and since then has become one of the most important issues we all deal with. We know it is responsible for a huge amount of biodiversity loss and that on islands invasives are

both especially destructive but also, actually, more possible to deal with than on larger land masses.

The first part of the session dealt with network-based solutions.

- Karen Varnham brought us up to date on the JNCC invasives database for the UKOTs and we learned how to both use this new tool and, by supplying information on our own situations, make the tool even more useful.
- Niall Moore told us about the new secretariat dealing with non-natives in Great Britain – real alphabet soup for the non-initiate – but which will mean a coordinated response to invasives and the possibility of rapid reaction when the circumstances require.
- Jean-Philippe Palasi told us about the French remote territories and the work they are doing, and confessed to us about the French predilection for studies and experts, rather than rapid reaction... Niall may have already started to help him convert his countrymen to the rapid reaction school.
- Claire Miller continued the RSPB tradition of appointing new staff to start work the week of our conference, and told us about the new South Atlantic network project which is also one week old. Especially as this EU-funded project evolved both from our last conference and meetings of our South Atlantic Working Group, we look forward to a good report on this at our next meeting, just as Sarah has been able to present the Important Bird Areas book for this one.

In the second half of the session we learned about the scale insect invasion of the pine yards of the Caicos Islands, where rapid reaction may no longer be an option for prevention – although it is essential to allow seed collection and propagation in the hope of future long-term recovery.

- We heard about dealing with the massive disruption of ecosystems after Hurricane Ivan submerged most of Grand Cayman Island.
- And we got some advice from New Zealand on techniques for deciding whether a pro-active or reactive approach to a problem is the better strategy.

One key theme for this session was the question of how to set priorities in dealing with invasives, and several ideas for this emerged to back up the discussion paper:

- An audit of measures that are already in place in each UKOT for invasive species management

(the Falkland's Biosecurity report has done this to some extent, and the RSPB S. Atlantic project will probably cover the other S. Atlantic Territories)

- Enhanced information gathering (Karen's review is just the start) and information sharing
- Better co-ordination of activities, within and between countries
- Rapid response mechanisms

## Environment Charters

Measuring progress in implementing the Environment Charters is important but not easy. The Forum published its draft measures nearly a year ago. Mike Pienkowski started us off by attempting to summarise progress on filling in information on these measures – putting flesh on the bones. The measures aimed to cover the commitments – or the equivalents by those without charters – by both the UKOTs /CDs and the UK Government. Mike stressed the need for more information from all parties to allow the completion of these measures, to avoid the otherwise inevitable confusion between “no information” and “nothing achieved”. So, everyone, please send Mike your information to help complete these tables in the conference papers.

- Cathy Hopkins outlined the benefits of using UKOTCF facilitators, based on the pilot work by them with TCI, in developing St Helena's strategy for action to implement their Environment Charter.
- Dominique Giudicelli filled us in on the ways the Falkland Islands was trying to integrate the Environment Charter and Biodiversity Strategy into planning across the sectors.
- Karim Hodge explained how Anguilla and some other territories benefited from the Organisation of Eastern Caribbean States approach via National Environment Management Strategies as well as the Environment Charters. There were great benefits in following one process but cross-tabulating to the other, for efficient working.
- Jennifer Gray demonstrated the remarkable progress that had been made in implementing Bermuda's Biodiversity Strategy and Action Plan since its launch at the time of our Bermuda conference three years ago.
- Simon Glass clearly and succinctly explained the amazingly rapid establishment of a system for Tristan whereby he, as Conservation Officer,

reports annually to the Territory's Council on progress on the Biodiversity Strategy and Environment Charter, and plans for the future.

- Like other Crown Dependencies, Alderney lacks an Environment Charter relationship with UK. However, Roland Gauvain explained how the Island was developing for itself a strategy based closely on the Environment Charters of the UKOTs.
- From her experience as Head of Conservation in the Isle of Man as well as part of UK's delegation to some Conferences to the Parties to Conventions, Liz Charter explored the differing international conventions to which territories were party and wondered whether further help, perhaps from UK Government and the Forum, might be valuable.

We then heard from the officials from HMG who have been such strong supporters of our work, and whose presence at this meeting we greatly appreciate.

The Overseas Territories Environment Programme, established by the FCO and DFID since the Bermuda meeting, has been a tremendous resource for all of us. We were pleased to hear Phil Mason of DFID praise the efficiency and effectiveness of the programme and thrilled to learn that DFID is committed to continued funding for the programme with £1.5 million over the next three years carrying on when the existing one expires at the end of this financial year.

We also learned from Helen Nellthorpe of the FCO that OTEP will be focusing on four programme areas for funding in the current round:

- Environmental governance
- Capacity building
- Invasive species
- Climate Change

Several of us were concerned about the two-year limit on project funding when the long-term nature of some biological and social processes would benefit greatly from longer-term funding. Phil Mason told us that there was both some consideration being given now to terms as long as ten years and that, as the DFID budget increases over the next years, we should see a commensurate increase in UKOT funding.

Eric Blencowe gave us a good overview of Defra and how the UKOTs fit into their funding programmes. Many of us have benefited from the

Darwin Programme over the years in its focus on capacity building and on projects which have real impact and legacy for biodiversity conservation.

Defra's more recent initiative is the World Summit on Sustainable Development Implementation Fund. This is meant to implement the UK's commitment to significantly reduce the rate of loss of biodiversity by 2010, and it has funded an important initiative in Montserrat with Kew and the JNCC.

Defra also has a flagship species fund which focuses on primates, trees and marine turtles, and a small grants fund where very small start-up projects can apply for funding through open competition.

We heard about the JNCC's role in advising on nature conservation in the Overseas Territories and Crown Dependencies and were glad to learn that JNCC will be devoting more resources to this area of work in the future. The priority will be to work in partnership with UK Government, Overseas Territory administrations and NGOs to address issues of common interest. Subjects that JNCC may get involved with include invasive non-native species, adaptation to climate change, implementation of multilateral environmental agreements, and application of the Ecosystem Approach.

We discussed the fact that these programmes are wonderful, but we will need more funding than they provide for some of the larger-scale programmes we need to carry out. HMG's officials were clear that greater magnitudes of funding is a decision for Ministers, not officials, but Dick Beales told us that DFID was going to commission a study on additional funding sources, as part of HMG's commitment under the Charters to help UKOTs find funding beyond what is provided by HMG.

## **Integration of Conservation & Sustainable Livelihoods – parallel sessions**

### **Terrestrial Session**

We were working with the following definition of sustainability: where enhancement of environment, economy and society meet - it recognises the human dimension.

- In the terrestrial session, we learned from



Gordon Liddle about managing a tourism industry in South Georgia with zero local population to take into account, but a glut of fur seals that is becoming a population problem in itself. Gordon thinks they have a shot at becoming the largest rat-free island in the world, which is a population solution that we can all envy.

- Naqqi Manco described the development of a low impact ecotourism industry in the Caicos Islands based on the management plan for the TCI's largest Ramsar site, and designed with full cooperation of the local people who are vitally concerned to preserve their way of life. This is a project which the Forum and its UK member organisations have partnered from the very beginning, and of which we can all be truly proud.
- Dick Beales described a few of the many issues involved in developing an airport with the minimum possible environmental impacts in St Helena.
- John Maurimootoo first depressed us all with the tale of mass extinctions throughout the span of human occupation on Mauritius and Rodrigues and then inspired us with his ideas on mainstreaming conservation issues by integrating them into the broader social context.

Among the many lessons from this session were five key points:

- Biodiversity is part of the system when it comes to project design in relation to biodiversity considerations.
- Importance of engaging with all stakeholders when undertaking major activities (Govt., NGO and the public).
- Creative solutions adapted to local needs should be adopted as a practice.
- Upscaling and mainstreaming – small scale experimental work should serve as a model to apply to larger projects. Mainstreaming is the adoption of biodiversity issues into broader societal issues.
- Invasive species is an issue of concern which is impacting a number of Territories affecting sustainable livelihoods.

## Marine Session

John Cooper introduced the session by highlighting the fact that small islands nearly always have a large area of marine responsibility. The problem was how could these be managed and effectively looked after.

Grant Munro described the huge mortality, both for seabirds and marine animals, e.g. turtles, from by-catch during different types of fishing operations. The good news story was that research into mitigation effects had shown that relatively simple and inexpensive mitigation techniques could dramatically reduce by-catch mortality. One example from South Georgia illustrates this. By-catch mortality in the tuna long line fisheries was 6000 birds per annum before mitigation measures were put in place, but at the end of the first year of implementing mitigation the by-catch mortality had dropped to 640 per annum.

Annie Glasspool spoke about development issues in the inshore marine zones of UKOTs/CDs. Her review had collected information across the UKOTs on the impacts of resource exploitation, trade and farming and service-based industries. One major issue was that although land planning was in place, there was little planning/ zoning of marine environment.

It emerged that the areas of major concern were focussed in Caribbean and Crown dependencies, which ranged from lack of capacity to inadequate laws and taking in huge issues of public awareness, poor communication between scientists and policy makers and a general lack of political will along the way.

Mike Brooke's paper (presented by John Cooper as Mike, sadly, had to leave early) was on the role of Marine Protected Areas in improving the conservation status of UKOT/CD territorial and EEZ waters. After presenting detailed information on where MPAs and Ramsar sites had already been established or proposed, he considered the many reasons reserves are established or proposed including the need to protect coral reefs, the need to protect representative ecosystems and important habitats and protection for areas potentially vulnerable to impacts by human activities and protection of species adversely impacted by fisheries.

Messages to come out of the review so far:

- Varying levels of designation across UKOTs
- Higher levels in more prosperous UKOTs (eg Bermuda) or uninhabited ones (e.g. BIOT, BAT) where few vested local interests
- Clear need to tailor protection level to what can be protected "on the ground": avoid paper parks
- Ramsar a useful tool for inshore areas.

In the final discussion it was stressed that we need to ensure existing and new marine fisheries are managed in a sustainable manner. There was particular frustration from representatives in Ascension that even when illegal fisheries were located, it seemed that nothing could be done.

## Education

This session was the last in a long day, but the enthusiasm and expertise on display kept us all on our toes. Ann Pienkowski walked us through the preparatory documents, reminding us of the key issues which need addressing. Nancy Woodfield Pascoe dazzled us with her BVI Interactive Environmental Atlas, making us all want an atlas for our countries and a dynamo like Nancy to run our programmes. Naqqi Manco told us about a new project for High Schoolers in the TCI – running a native plants nursery and John McGuinness told us how he got most of Jersey mobilised for an environment week in Jersey schools. Grant Munro told us about a collaborative project to produce education packs for schools in both the Falklands and Ascension.

The discussion was detailed and resulted in four recommendations:

1. We need to develop a mechanism for being able to share resources and exchange ideas and approaches more easily. An education section on the Forum's the website will provide reciprocal links with territories and other global resources and education sites. This will grow over time.
2. Continue to develop environmentally-focused academic programmes at all levels for students and teachers that apply emerging technologies, use local environments within a global context, and foster world-wide networking and professional development.
3. Raise political awareness and commitment towards solving environmental issues through good governance and accountability and transparency in the decision making process.
4. Through environmental education, raise public awareness, thus empowering communities and stakeholders to influence the decision making processes.

## Resources

On Tuesday afternoon, the Forum's Treasurer, Nigel Crocker, chaired a session on resources which opened a lot of eyes about new possibilities for funding and strategies for achieving goals with resources other than money.

We heard about a new approach to EU funding for biodiversity conservation from Philippe Feldmann and about an exciting new alliance involving the Forum, IUCN and other bodies as well as the European Outermost Regions and Overseas Countries and Territories from Jean-Philippe Palasi, both of which the Forum is pursuing on our behalf and which offer the possibility of accessing serious amounts of money for very serious projects. The fact that the EU has now recognised that biodiversity in all their various overseas territories is their responsibility and that responsibility for funding this work has now been accepted as a formal Challenge of the EU is heartening news indeed.

We are all aware of the conundrum we face in funding – no international funding because we're part of the UK, but no UK funding because we're not actually IN the UK. We heard that the Dutch Caribbean Nature Alliance have the same problem, but that they have solved it by accessing Dutch Postcode Lottery funding using a partnership with IUCN and have gotten a commitment for endowment funds from the Dutch government. While endowment funds from the UK government seem to be considered possible only in rare hypothetical cases, we do hope to explore the possibility of the British lottery funds being made accessible to us.

Fred Burton discussed the funding of an important local species recovery project, reviewing the constraints on local fundraising and the need to find permanent funding sources for projects which will need financial support virtually forever. In better-off territories like Cayman, there are both substantial business interests which provide significant grant money and a fund collected by Government from tourists to support environmental projects – if this fund worked as it should (and Gina Ebanks-Petrie seems to be optimistic that it will) substantial support could be relied on into the indefinite future. Of course, it is recognised that in many territories this kind of local funding is not possible and international help

is the only way to fund biodiversity conservation programmes.

For countries and NGOs with very limited financial resources, John Cortes gave us a ten minute lesson in how to make something out of nothing that resulted largely in a general desire to clone John himself and have him run all our organisations. Seriously, he had excellent advice about using volunteers and various means to use pressure and influence to get people and agencies to do things that in fact benefit everyone. UKOTCF is currently experimenting with volunteering in other situations and is investigating the possibility of developing more systematic coordination of volunteers and donated secondments.

## Posters

And finally, a word about the silent contributions to the conference. The 40+ presentations dotted around the walls of our conference rooms filled out the content in a very content-heavy few days. Overall they were impressive and expressed a deep sense of national pride by the authors. This especially pertained to those which spoke of native and endemic biodiversity. It also is evident that we have amongst us an extraordinary gathering of photographers; the quality of the images is suggestive of National Geographic quality in many cases. Many of these presentations were a welcome window into the culture of our special territories where we saw community participation and homeland names entwined in progressive monitoring, research, and educational programmes.

We can see from these presentations that OTEP has a supporting presence throughout the region and the Darwin Initiative continues to do good work. It is somewhat concerning that these sources for funding are so limited but at the same time refreshing to see JNCC offering so much future

assistance.

Posters revealed that throughout the region we are all working hard and going in the right direction. If the Ascension islands were successful at eradicating the entire island of feral cats and then successfully reintroduced a sea bird colony and Falklands can succeed at reducing mortality in sea bird populations by 90% then we can safely say that all our efforts are worthwhile and that there is hope for the biodiversity in our territories in the hands of this group of passionate environmentalists.

## Working Groups

Some of the first key points coming out of the reports from the Forum's regional Working Groups were noted. The Wider Caribbean Working Group considered that UK Government should write to all the governments of the UKOTs to remind them of their obligations under the Environment Charters, as well as UK's own commitments. The South Atlantic Working Group had some ideas for improving their own communications, and Pitcairn had some good ideas for joining in. There was an enthusiastic exploratory meeting about a possible Europe Working Group (that is a group focussing on the Crown Dependencies and UKOTs in Europe, as opposed to one dealing with the Forum's links to European Union institutions). This last group meeting and the actions it proposed benefited greatly from the enthusiasm of our Jersey senior student participants, and they and their fellows also gave the conference an excellent summing-up of their reactions to the conference.

All these ideas will give the Forum's Council food for thought on how the Forum works, and some early actions are expected.





# Topic 1: Opening of Conference and Conservation issues of Jersey

This section includes the opening of the conference with the welcoming addresses by the Bailiff and the Minister of Health, as well as an introduction to Jersey's environment and conservation issues by a team from the Jersey-based organisations of the organising team. An integral part of that introduction was a walk on the seabed in Jersey's first Ramsar site. This was: to recover from travel; get to know other participants (a very worth-while approach on past experience); and a chance to see some of the most remarkable features of Jersey's biodiversity. Jersey is within the Baie du Mont St Michel, which has one of the highest tidal ranges in the world. The conference dates coincided with the most extreme tides for 4 years, allowing a range of walks along the sea-bed at low-water – in particular a 3-hour, 3-mile journey across one of the most unusual intertidal habitats on the planet. With each low tide, the Bailiwick of Jersey doubles in size. Our guided walk across part of “the other half of the Crown Dependency” was led by marine biologist and “professional walker”, Andrew Syvret – one of the most experienced guides to this area – and his team of skilled volunteers. The south-east coast of the Island forms the last vestiges of Great Britain's land-bridge to continental Europe. Of great cultural and historical significance to Jersey-folk, this area was designated as the Channel Island's first Ramsar site in 2000. It is home to an astonishing variety of life, site of a French invasion and once upon a time proposed location for an international airport. Participants were fascinated by boulder-fields, oyster-farms, lagoons, wave-cut platforms, sand banks and saltwater-filled gullies on the way to and from two of Jersey's most interesting coastal defence towers. On this page are illustrated some of the images of that day.



# Introduction to the Conference by the Chairman of the UK Overseas Territories Conservation Forum

**Dr Mike Pienkowski**

Good evening, everyone. For those who do not know me, my name is Mike Pienkowski, and I am the Chairman of the UK Overseas Territories Conservation Forum.

In a few moments, I will ask the Bailiff of Jersey, Sir Philip Bailhache, to start off our conference. First, however, let me say a few words of background.

The conference is being organized by the UK Overseas Territories Conservation Forum in consultation with our partners in Jersey, both governmental and non-governmental. It is supported by: The Overseas Territories Environment Programme (OTEP) of the UK Foreign and Commonwealth Office and Department for International Development;

UK Overseas Territories Conservation Forum;  
The Environmental Department of the States of Jersey;

The Société Jersiaise;

The National Trust for Jersey

The Durrell Wildlife Conservation Trust;

IAIA (International Association for Impact Assessment) 'Capacity Building for Biodiversity and Impact Assessment Project' (CBBIA), funded by the Dutch Government;

Royal Society for the Protection of Birds; and the Commonwealth Foundation

- as well, of course, as all participants and, where appropriate, their organisations.

Thanks to all.

This is the fourth conference to centre on nature conservation in the UK Overseas Territories, with increasingly strong links also to the Crown Dependencies, the Overseas Countries and Territories of other European Union Member States, and to small independent states.

Some people may consider these small countries and territories as a little peripheral. However, in terms of nature, the UK Overseas Territories are far more important in global terms than the larger islands of Great Britain and Northern Ireland.

The first conference to be held was in 1999 in

London, organised primarily by the Foreign & Commonwealth Office, but with strong help from UKOTCF. I have to add quickly, in deference to our friends for Gibraltar, that the first to be planned was the *Calpe 2000* conference held in Gibraltar in 2000, and organised jointly by UKOTCF and partners in Gibraltar Government and Gibraltar Ornithological & Natural History Society. These were followed by the Bermuda conference *A Sense of Direction* in 2003.

These have all been working conferences. This means that we need to limit the number of topics covered to allow reasonable depth of coverage in each. The actual choice of topics was based on a wide consultation amongst practitioners in the Territories and others with an interest. In order to allow preparations, this consultation was conducted in the early planning stage quite a while ago. Inevitably, we have not been able to address some topics that many would have liked. In some cases, such as climate change issues, these were a major topic at the previous conference. This and other topics will doubtless come into discussion in some of the other sessions, as topics are inter-linked.

I am delighted to say that we do have representation, for at least some of the conference from:

all 5 (or 3, depending on how one counts them)

Crown Dependencies;

all of the inhabited UK Overseas Territories, except the Pitcairn Islands, and Pitcairn have asked the person leading on their environment charter strategic plan to represent them, jointly with UK government colleagues.

For each of the uninhabited UK Overseas Territories, there is (or will be) someone at the conference either to represent them or who studies in the territory concerned.

As in our previous conferences, we welcome also personnel from the French and Netherlands overseas territories. We are developing a well integrated alliance with the equivalent bodies to UKOTCF in those countries, to assist promoting these important issues in the European Union institutions.

As ever, we welcome the presence of small independent states, to give us a different viewpoint. In

fact, I am pleased to say that, in addition to the 21 UK territories, there are at least 15 countries due to be represented at this conference.

We always try to innovate at these conferences, and there are several new features that we are trying out this time. I will not mention them all, but I would like to draw attention to the participation of several senior school and college students throughout the conference, mainly from tomorrow. They have won their supported places by their efforts, and we look forward to their views and questions, so relevant to the future, to keep us on our toes.

We are very grateful to Jersey for the invitation and hospitality. We look forward very much to hearing tomorrow more about the island and its environmental issues – as well as seeing for ourselves as we take a walk on the seabed exploring the huge tidal range which is one of Jersey's most spectacular features.

For the first time, the conference is being held in a Crown Dependency, rather than an Overseas Terri-

tory. I am sometimes asked what is the difference between a Crown Dependency and an Overseas Territory. I am not going to dare to try to answer that with a distinguished lawyer and leader of the community standing beside me. However, I do recall the alleged answer of a British Government official when stumped by this question: that, in order to be a Crown Dependency, one has to invade and conquer at least part of Great Britain. I suspect that this is not the constitutional answer. However, Jersey has been linked to Britain since it was part of the Dukedom of Normandy, and its Duke William became William the Conqueror. So, there is at least some basis of the claim that I have heard from more than one Jerseyman that the United Kingdom is, in fact, an Overseas Territory of Jersey (and of the other Channel Islands – but Jersey does not usually claim things on their behalf too)!

Before I dig myself deeper into an historical mire, I would like to stop and have the great honour and pleasure of handing over to Sir Philip to open our conference.



*The Bailiff of Jersey, Sir Philip Bailhache DHumL, MP (left) and UKOTCF Chairman, Dr Mike Pienkowski*

# Opening of the Conference

## Sir Philip Bailhache, Bailiff of Jersey

Chairman and members of the Executive Council, visiting delegates, ladies and gentlemen,

It is a great honour for me to welcome you all to the Bailiwick for the 2006 Conference of the United Kingdom Overseas Territories Conservation Forum. It is, I believe, the fourth occasion on which like minded representatives from U.K. Overseas Territories, Crown Dependencies and other small islands have come together to share experiences, thoughts and exchange ideas that seek to protect our rich and colourful biodiversities against the social and economic pressures of the 21st century.

Delighted as I am that you have chosen to meet in Jersey, it is of course neither part of the United Kingdom nor an Overseas Territory, so may I first of all tell you a little bit about our constitutional history? The past, I think, is not irrelevant to the purposes of your forum. A community that is proud of its history and its traditions is likely to be a community which relates to its natural environment and which feels protective about the best elements of its architectural heritage. I think that I also speak for the silent majority when I say that there are elements of our architectural heritage created in the 1960s and 70s, and even later, which make us pray earnestly for a selective tornado or tropical hurricane such as some of you have occasionally to endure.

Our recent history starts in 1066. In that year William, Duke of Normandy, crossed the Channel and defeated King Harold at Hastings. Numbers of Jerseymen and Guernseymen were undoubtedly in that invading force and we sometimes like to tease our English friends by reminding them that England was the Channel Islands' first colony. In 1204 the Norman duke and English King, John, lost continental Normandy to the French King Philippe Auguste, and the Channel Islanders found themselves alone in a hostile sea, cut off from Caen and Rouen which were their cultural and administrative capitals respectively. King John offered our predecessors a number of constitutional privileges, including Royal protection and the privilege of self-government according to our own laws, in exchange for loyalty to the Crown. The great medieval castle, Mont Orgueil, was built at Gorey

and Jersey's autonomy was born. Jersey has always been loyal to the Crown, even during the English civil war, and our constitutional relationship is accordingly with the Sovereign; that is why we are a Crown dependency and not an overseas territory of the United Kingdom.

The Island's Norman heritage endures in our language, *Jerriais*, in our law which is still in part based upon Norman customary law, in various traditions, and of course in the vernacular architecture which uses our native granite in a way that respects the natural laws of symmetry and proportion.

I described our recent history as beginning in 1066, slightly tongue in cheek, because we do have some Neolithic sites and burial chambers of European importance dating back 6,000 years or more. At that time we were of course literally attached to Normandy. For a small place there is much of interest ranging from dramatic castles and forts constructed many centuries ago, coastal areas of sand dunes, cliffs and beaches, the last subject to a huge tidal flow which rises and falls by more than 40 feet during the equinoxes and increases the size of the Island by no less than 40% at low tide.

Jersey has shown, I believe, considerable commitment to the need to protect its heritage and environment, and to cherish its biodiversity. Member organisations of the Conservation Forum found in Jersey include the National Trust for Jersey and the Société Jersiaise which seek to conserve everything good about Jersey's natural environment encompassing a rich variety of woodland, farmland, heath land, meadows and wetland. From the dramatic system of sand dunes located on the west coast of the Island to the rocky marine coast in the east protected under the Ramsar Convention on Wetlands, the Bailiwick has, like many other small island communities, recognised the benefits to the local population and visitors alike of having well managed conservation areas that will be enjoyed for generations to come.

There is, perhaps, no better model in Jersey of an international conservation organisation than Durrell Wildlife Preservation Trust which is committed to preserving the future of endangered species worldwide. An important part of Durrell's work is



raising awareness and educating the next generation on the importance of conservation, wildlife preservation and the environment. The need to raise awareness and to educate is a matter that will, no doubt, be considered during your conference and may form the foundation for future conservation strategies. I am sure that we all subscribe to the view that there is an urgent need to promote the co-ordinated conservation of threatened plant and animal species and their natural habitats.

I know that I speak for all those delegates from Jersey attending this conference when I say how much we appreciate the opportunity to learn and to benefit from the expertise assembled from so many other places, but particularly the United Kingdom. Small places like Jersey and many others represented here have an incredible diversity of fascinating flora, fauna and important eco-systems which may enrich the experience of experts from

the UK [and France]. Small jurisdictions like ours, however, cannot provide the breadth and depth of research and knowledge which is available in larger countries. One of the great strengths of conferences such as these is the opportunity it affords to exchange views, experiences and opinions, and to promote the development of shared objectives and common policies which underpin the work of the U.K. Overseas Territories Conservation Forum.

Your agenda for the week will, no doubt, be a demanding one, but I hope that your conference will be fruitful and rewarding, and that your discussions take place in an atmosphere of relaxation and mutual respect. I hope too that you may find the time to explore at least part of the Bailiwick and to discover many of the natural delights which we, I am afraid, too often take for granted. I welcome you all most warmly to Jersey.



*The Bailiff meets the team from Gibraltar: Charles Perez, Dr Eric Shaw and Dr John Cortes.*



# Welcoming Address on behalf of the Government of Jersey

## Senator Stuart Syvret, Minister for Health and Social Services



Mr Chairman, Colleagues, distinguished Guests, delegates, ladies and gentlemen.

I am very pleased to have this opportunity to welcome you all on behalf of the government and people of Jersey. I know that many of you will have made very long journeys to be at this conference, the first of its type ever held in Jersey, and I am confident that you will receive a warm welcome.

Much as ecosystems are complex networks of interdependencies so too are the affairs of humans. Just as we cannot truly know a species until we look at it within the context of its ecosystem, we cannot make sense of our impact upon the rest of nature unless we understand the complex drives of human society.

I have been a keen environmentalist since I was a teenager. To this day I still work with Greenpeace. During campaigns, we sometimes talk about whether we are succeeding in making a difference. We always agree that just being concerned with only the environment simply isn't enough. For example, habitat destruction will not be stopped until we understand – and address - the needs of people. Can we criticise the starving peasant who fells some rainforest so that he may feed his family? Should we blame the poor of the world's slums for polluting their rivers? No. To have any

chance of enabling people to live sustainably, we must change society so that the basic needs of all of the world's people are met. Tom Athanasiou, in his 1997 book *Slow Reckoning*, said that history will judge the green movement by how it stands by the world's poor. Not only is Athanasiou correct by any respectable ethical or moral standard – he is correct from a utilitarian perspective. No matter how scientifically brilliant a study of those plants, these fishes or those lizards might be, the effort put in will count for nought unless we can assuage the basic needs of human society. Studying the butterfly will not stop its habitat being destroyed by development. To have any chance of making a difference we need to understand human needs, economics, the media, politics, societies – and human history.

It is surely clear that the great challenge that lies before us is to recognise the limits of our exploitation of the planet. As a species, we will either succeed in this or perish - and take much of the biosphere with us.

Many of you will be from island communities in which the fishing industry is a principal part of your economy. Yet we all know that the fish stocks of all the world's oceans are under great threat. Indeed, the evidence shows that many fisheries are hurtling towards catastrophic collapse. This can be no surprise to us. Experts – such as yourselves – have been warning us of this crisis for decades. Every few years scientists produce another major study warning of disaster for European fish stocks – the evidence gets ever starker. And still politicians do nothing; more concerned at negative media comment from trawler men than with the inevitable ecological and economic disaster. It seems likely that we will not stop fishing until there is nothing left to catch.

Jersey has many great environments and beautiful locations. But as beautiful as much of Jersey is, we too are failing in many of the most important ways. Every year more fields disappear under housing developments. We consume more products and produce more rubbish. The traffic jams get worse. Indeed, motor transport is a particularly telling example. Only a couple of days ago, my Ministerial colleagues and I received a presentation of plans

for the improvement and regeneration of St. Helier. A key feature of the proposals is the spending of many tens of millions of pounds on the building of new roads and car parks. It seems to matter nothing that energy consumption is causing rapid climate change that may threaten human survival; nor that the world has passed peak oil production at the same time as demand from developing economies begins to catch up with the profligacy of the west. The highly likely consequence is that cheap motoring will be an historical artefact within 20 years. Yet, these considerations may as well not exist as far as the short-term imperatives of politicians and planners are concerned. And this is just one example of our societal inability to think in the long-term. The conference you are participating in is one of the means which might help improve our knowledge of the impacts we have on small island environments.

I hope that your presence in Jersey might help us to start making the right decisions.

Before you embark on the busy conference programme you will be taking a walk at low tide in our Ramsar site on the South East Coast. The conference happily coincides with one of the largest tides in recent years. Few places on earth have such an expanse of rocky seabed exposed by the tides. It is a richly diverse habitat. You will also be visiting the Country Life Museum at Hamptonne from which you can learn of the agricultural history of the Island; a history in which our culture has its roots. No visit to Jersey can be complete without experiencing Durrell, which is the headquarters of the Durrell Wildlife Conservation Trust. From these experiences I hope you will see why we have a deep bond with our small Island.

I must thank the organisers of this conference for making places available to students from local schools. Education must be one of our great hopes if we are to help future generations – and ourselves – to be aware of the complex web of sociology, economics, politics and ecology upon which saving the planet depends. Perhaps it is so, that in small islands we might see the needs more pressingly.

I would like to thank our local partner organisations in the Island, particularly Société Jersiaise, Durrell and the National Trust for Jersey, who have worked with the Environment department to help make this conference happen.

At this time of year many of our birds have flown

south to such places as the Okavango delta, whilst other birds arrive from Russia to spend the winter here. Many of you will have likewise traversed the great geographies to get to Jersey. Whilst your efforts will not have perhaps been as great as that of the swallow or the swan, I'm sure you had a tiring journey to be with us. I hope your time here is both enjoyable and productive. Let us hope that our knowledge is shared and our understanding improved. Only by human co-operation can we succeed.

Thank you.

# Jersey: Environmental Challenges and Achievements

**Mike Freeman, Principal Ecologist States of Jersey, Environment Department**



Freeman, M. 2007. Jersey: Environmental Challenges and Achievements. pp 28-37 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

A brief history of conservation work in Jersey over the last 26 years, including the work on the Conservation of Wildlife (Jersey) Law 2000, the Biodiversity Strategy of 2000 and the Biodiversity Action Plans, published in July this year. Policy development, political involvement, Multilateral Environmental Agreements and awareness raising in Jersey are covered.

**Mike Freeman**, Principal Ecologist, States of Jersey, Planning & Environment Dept  
Howard Davis Farm, La Route de la Trinité, Trinity, Jersey.  
[m.freeman@gov.je](mailto:m.freeman@gov.je) [www.env.gov.je](http://www.env.gov.je)

Before I start, I would just like to say how pleased I am personally to welcome you all to Jersey. I hope you enjoy your time here. Today I am going to talk mainly about how things have developed in the last six years.

## Historical Perspective

But first I want to put the challenges and achievements in some sort of historical perspective. A Jersey government department devoted to environmental issues has existed since 1979, albeit that for the first 15 years the section was only two full time staff.

It is important to remember that Jersey is very fortunate to have had a very high standard of works on natural history. The work of the Société Jersiaise laid firm foundations for all the work that has been done since, and members continue to provide surveys and studies which contribute greatly to our progress.

We have benefited greatly from our connections with universities in the UK. University College London's MSc in conservation studies helped us immensely in carrying out work which consolidated and advanced many areas of study. Without their work we would have not for instance have been able to complete the species action plans which I will talk about in a minute.

Our workforce in those days was entirely made up by students from UK and French universities, whose work ranged from education through practical management tasks to surveys and studies.

In the late 1970s most of the island's rubbish was dumped on the west coast. Sand had been dug and the holes were then filled with the rubbish. It was



*Sand-pits and some filled with rubbish, La Mielle de Morville in the 1980s*

clear that the final land-form would not, to say the least, demonstrate a sensitive approach to landscape restoration, and it was decided to plan the restoration taking into account a range of factors – what we would recognise now as a sustainable approach.

I joined the department as a part-time gardener in 1980 and my task, with the help of volunteers and students, to work with nature to restore the tips to a sort of dry coastal grassland habitat. The idea also was to use the site as a recreational area to take pressure off the sand dunes at the other end of the bay. The final results were very successful and the site is now well used.

Interestingly, the story of St Ouens Bay reflects how natural constraints can help to protect areas. In the 1950s there were plans for a housing estate in the bay, but apparently the high water-table and the fact that sewage would have to be pumped up out of the bay for treatment led to the plan being abandoned. Technological advance and increasing land values make natural constraints less of an impediment to development now, but we now have robust statutory measures in place which should provide protection for our valuable semi-natural habitats

Our work was, for the next 20 years, directed mainly in two areas.

The first was education and awareness-raising. Hand-in-hand with that we gradually extended our management and survey activities across the Island. Often our contribution to wider debates about the environment was greeted less than enthusiastically. I can remember receiving an early effort on an environmental impact assessment which read, in its entirety “there is no environment in this area”

So the St Ouens Bay restoration plan was important because it demonstrated that an environmentally aware approach to landscape restoration achieved excellent results for a comparatively low



*Restoration complete at St Ouens Bay*

cost. It also demonstrated the value of holistic planning approach.

These insights fed into the work that led to the 1986 Island Plan.

It took a long time, but in 1996 we designated our first sites of special interest, and in 2000 the Conservation of Wildlife (Jersey) Law was adopted. In the same year our first Ramsar site (on the south-east coast which we will be visiting) was designated, and the Biodiversity Strategy, which I spoke about at the Gibraltar Conference that year, was adopted. Thus species were protected by the wildlife law, and habitats designated through the Planning Law

At the end of the 1990s we reviewed the success of the St Ouen's Bay plan, largely through reviewing the experience of 20 years of management from a landscape perspective. In the light of that review, we made policy recommendations as part of the work for the new Island plan, which was also based on an Island-wide landscape character appraisal.

Throughout the period 1980 to 2000, we encouraged our government to seek from the UK ratification on our behalf of many multilateral environmental agreements. The Convention on Biological Diversity, the Ramsar Convention on Wetlands, the Convention on Migratory Species and others have all been very useful to us. The first Ramsar designation was very controversial; yet the second set were greeted with enthusiasm, and my colleagues



in fisheries enforcement confirm that fishermen now are proud that the areas they work in and love are internationally recognised.

### **The *State of Jersey* document and the Pressure - State - Response Framework**

More organisational change at the beginning of the new century led to our section merging with others to form a department with responsibilities for more than biodiversity conservation. The Environment Department now has regulatory responsibilities which cover a range of environmental areas covering land, freshwater and marine. The process is still in a formative stage, but it is clearly the best way forward because, as we know, everything relates to the environment, and this strategy brings the issues into a coherent whole

The *State of Jersey Report* was produced to provide the basis for the work of the new department. I am now going to outline the process we followed, including the pressure-state-response framework we used.

#### **Introduction**

There are many ways to look at and categorise the environment. We adapted the old “think global, act local” approach.

No island is an island; changes in climate, economic conditions and societal pressures have effects on everything. In this global space we look at the factors in our immediate geographical area, determination of rarity in our biodiversity, local climate and economic influence.

As we zoom in on the Island we begin to focus on the detail and the landscape whence we derive our strategies and, as finally we look through the smallest window, we can see right down to the level of the individual inhabitant of the Island be that ourselves or the creatures we share it with.

There were 4 phases used in the development of the document.

The first stage involved identifying twelve environmental perspectives using the ‘global to personal’ approach I have just described, and I would like to take you through these 12 perspectives in turn

#### **The global scale**

There is increasing evidence that man-made

emissions are accelerating global climate change. Locally, this will affect sea defences, water resource availability, disrupt ecosystems and alter conditions for agriculture and potentially human health. We also look at controls on trade in globally endangered species

At this scale we also must consider Jersey’s contribution to global biodiversity. Jersey’s geographical position makes it an important refuge for many migratory species such as migratory birds, bats, fish and marine mammals

As we come closer to the Island we can see the familiar landscape and character of Jersey as a fine scale mosaic of suburban, agricultural and semi-natural habitats.

#### **Land**

Changes in land-use can impact upon the areas available for growing food, for recreation and through the loss or alteration of semi-natural habitat can affect natural processes. It is here that the major local challenge arises: how to balance requirements for development with preserving semi-natural habitats.

Fortunately for Jersey, contaminated land is not widespread, but there are nasty little secrets lurking about which need attention when development is proposed. The use of land can be restricted by contamination, which can create direct risks to human health, property and the wider environment.

#### **Water**

The Island is reliant on its surface and ground waters for drinking water, irrigation, industry and recreation, as well as for sustaining a vital natural habitat. The appropriate management of this resource is, therefore, vital both for human and ecosystem health.

Our local marine habitat is exceptionally rich in species, and the water quality is generally considered high. However, there is still a threat, particularly from man-made sources of pollution. High-quality marine waters and beaches are vital in underpinning both tourism and the fisheries industry.

#### **Waste**

Jersey produces large quantities of waste per capita, and waste handling and disposal are a major challenge. Municipal solid waste production in Jersey has increased by 3% per annum in recent years



and the incinerator is getting old and dirty. With the proclaimed need for economic growth, there is the probability that waste will increase, and waste streams will be more complex and difficult to deal with.

The challenge is to reduce, re-use, recycle and develop more sustainable ways of dealing with what is left.

### Habitats

At this scale we look at: the range of habitat types and their ecosystems in Jersey, and try to work out how they can be best looked after; management planning and protection from pollution; land-use planning which takes account of the need to preserve habitats and connectivity; and dealing with the effects of introduced species, some of which may change and possibly damage local ecosystems.

Jersey's countryside was largely formed and continues to be changed by agriculture. However, the agricultural industry is itself changing in the face of economic pressures. Managing the complexity of these changes is a further challenge.

### Key Biological Populations

Jersey supports a richness and variety of wildlife that is not matched, area for area, anywhere in Europe. Our natural resources require a high level of protection to ensure their survival given the pressures that arise from human activities.

We may wish to conserve species or communities because they are rare, because they are economically valuable, or because they are good indicators of the quality of the places where they live.

### Individual

Finally, at the individual scale we must look at how our surroundings affect our lives, and how the way we live affects our surroundings. If we are to manage our habitat in such a way that we can pass it on, preferably improved, to future generations, each of us has the opportunity to help by living in an environmentally responsible way in order to help maintain the Island's environment now and for the future.

### Measuring Progress

So, there are the 12 environmental perspectives which gives us a starting point for examining the environment.

However this is just the first step; how are we to know if we are successfully addressing all the angles of these critical themes? Clearly we must measure our progress and this is where monitoring is essential.

### Monitoring

Monitoring is about identifying changing trends and identifying when, and what sort of action is needed

It is essential if we are to have an informed basis for assessing the priorities of our actions, charting our progress, and planning effectively and efficiently for the future.

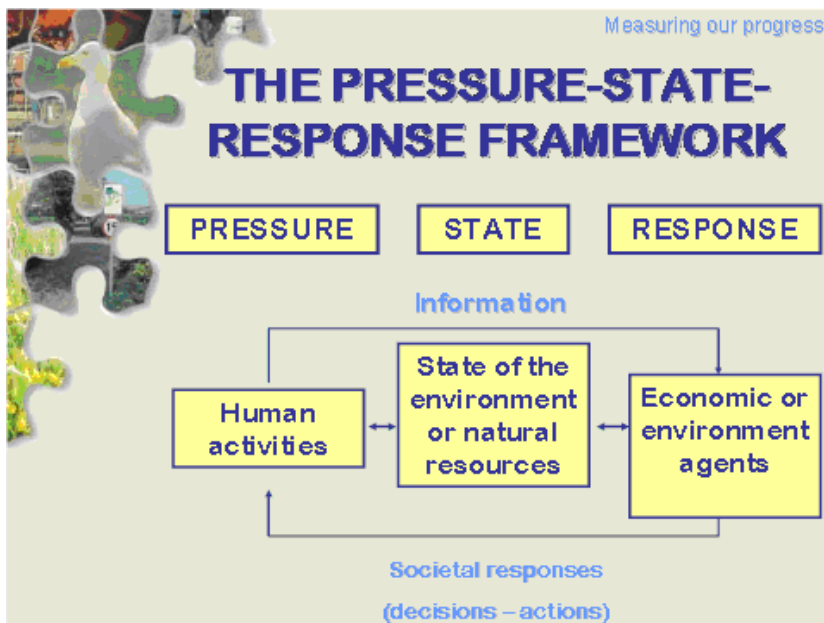
Of course, some monitoring has been carried out by governmental and non-governmental organizations for a long time. For instance, climate records collected at Maison St Louis stretch back over 100 years. As I mentioned earlier, the Société Jersiaise have been recording since the formation in 1873.

However, in order to monitor the state of the environment and changes in these conditions efficiently and economically, single issues or events are often used as indicators. Because environmental processes are often complex and inter-related so identifying the appropriate indicators can be difficult. However one framework to help us that has been used successfully elsewhere is the pressure-state-response framework. This involves looking at the **state** of our environment, what **pressures** cause it to be in that state, and working out how we can **respond**

In more detail (see diagram on next page) we can see that human activities exert **pressures** on the environment which can induce changes in its **state**. Society then **responds** to these changes through environmental, general economic and sectoral policies.

By carrying out monitoring within this framework we can, over time, assess whether our responses are having the desired effect. The *State of Jersey Report* signals the beginning of an **integrated** programme of work that aims to report on the State of our Environment.

The report itself is long and detailed, and the result of the kind and generous contribution of existing data sets and information from many Departments and Stakeholders. The report draws a line in the sand for us and points to the way forward.



Environment Department launched a monitoring programme that uses butterflies as indicators of the condition of different habitat types. With the necessary training, 18 dedicated volunteers were able to collect information on 28 sites Island-wide, and provide a level of coverage impossible to achieve through Governmental resources alone. This project follows procedures developed by a similar project in the UK, and Jersey's volunteers join hundreds across the UK who provide invaluable information nationally.

So to sum up so far, I have described to you how in the report

### Monitoring 40 environmental indicators

But even with pledges to monitor and improve our environment, we can know if our responses are successful only by continuing to measure the state of our environment. To this end we have outlined a programme to monitor 40 environmental indicators into the long-term.

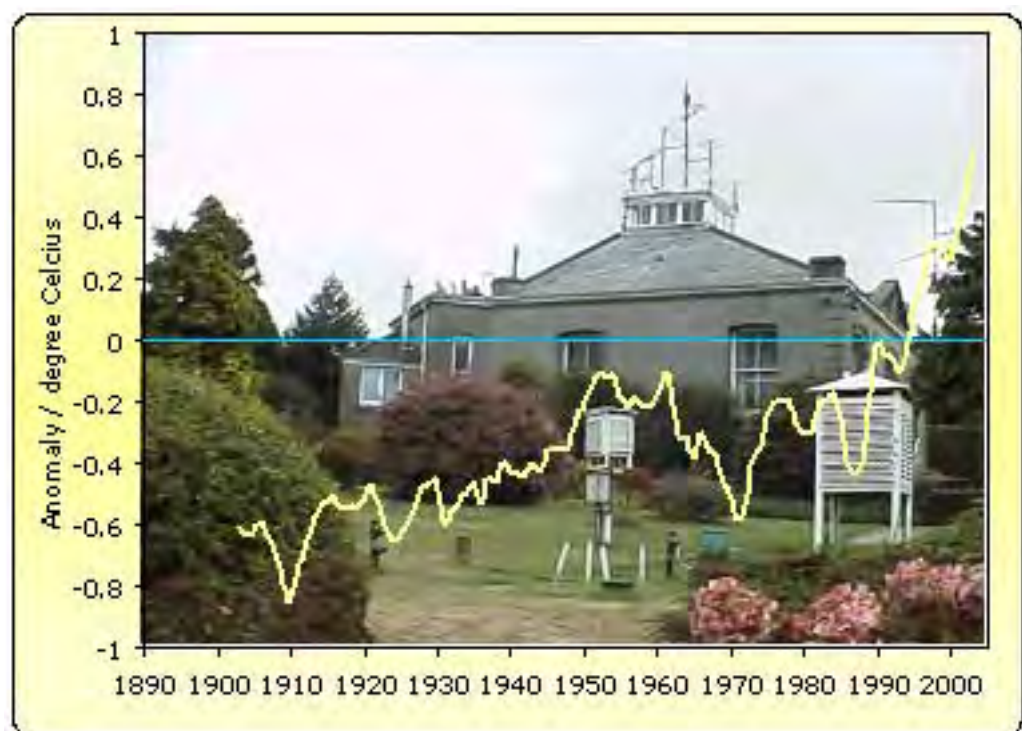
Importantly, often the data sets contributing to these indicators are already being collected so that we can simply report back on it in a more co-ordinated and accessible manner. Some indicators have required new or updated projects to collect the required information.

we categorised our local environment, examined the state of it, the pressures that have caused it to be that way, and looked at ways to respond to this. We have explained how and why we intend to monitor and report back to you using 40 key indicators. Although Jersey has a high quality of life sustained by a good quality environment, there is no room for complacency.

From the analysis of Jersey's environment, we have identified the five key environmental priorities. They are climate, waste, water, transport, countryside and natural history. I want to look at each issue in turn and consider the issues associ-

Clearly some subjects require specialist attention – for example monitoring air quality is carried out by the Health Protection Unit. Nevertheless there is room for us all to help. In creating projects to collect indicator data, we have looked to use community resources as much as possible.

For example, in 2004 the Envi-

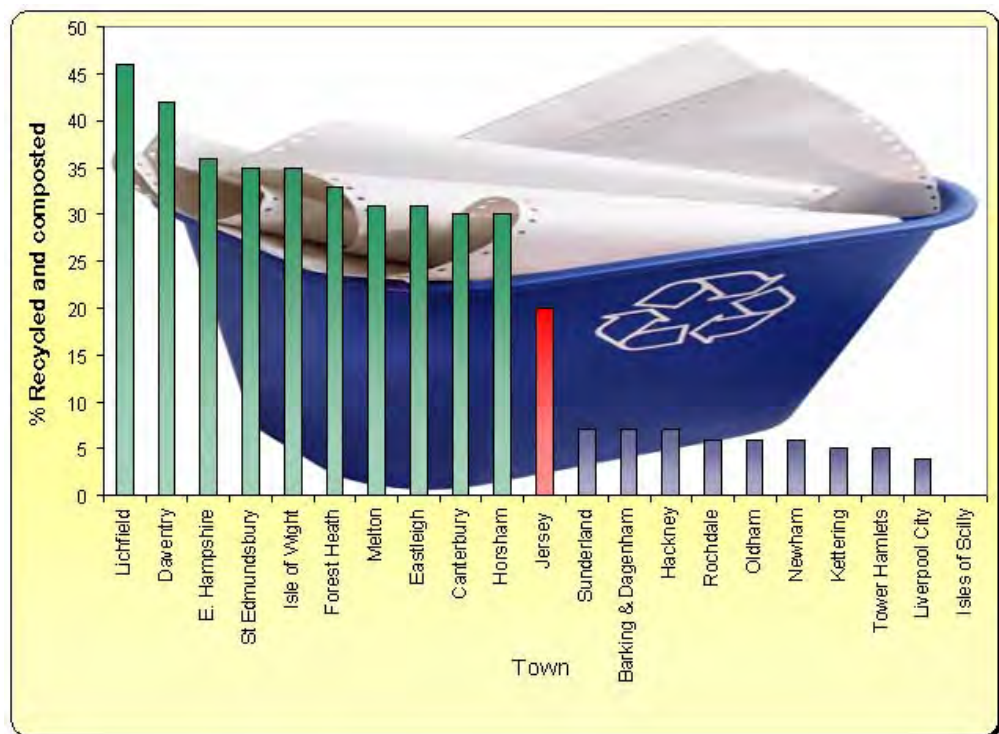


ated with that environmental priority.

### Climate

Jersey has a high reliance on private cars for local transport, and a dependence on fossil fuels for industrial and domestic uses contributes to local emissions of greenhouse gases.

The graph here shows the measurable temperature rise since 1900 as recorded at Maison St Louis, St Helier.



This temperature increase is in line with that observed globally and is considered to be indicative of global climate change. A changed climate will bring major challenges for Jersey, drastically less summer rainfall, greater storminess and rising sea levels.

### Waste

Excessive waste generation represents a misuse of resources and causes pollution. Jersey's municipal waste has risen by, on average, almost 3% for the last five years.

Emissions from our present incinerator fall well short of accepted standards. Furthermore our levels of recycling, whilst better than the UK, are not as good as have been shown possible in other European countries.

The graph (above) shows how Jersey compares to UK local authorities. It is clear that performance depends on the attitude and approach of the managing authority. We can see how Jersey compares to the 2004 recycling and composting figures for the UK. The top 10 councils are shown in green with the best achieving 46%, whilst the worst 10 are shown in blue with the Isles of Scilly managing no recycling at all. Jersey, shown in red, achieved 20% (in 2002). We can achieve more but there are some real issues associated with access to recycling markets and the cost of transport off island.

### Water

The replenishment of local water resources is from rainfall – a finite resource. Around 90% of the Island's population receive their water from the public water supply, which is predominately collected from streams. Currently there are no controls to ensure that these supplies are protected from over abstraction.

The quality of these waters is affected by diffuse pollution (such as nitrates from fertilizer applications and soakaways) or point source pollution (such as oil spillages from heating tanks).

The graph shows how in recent years with the introduction of the Water Pollution law in 2000 and





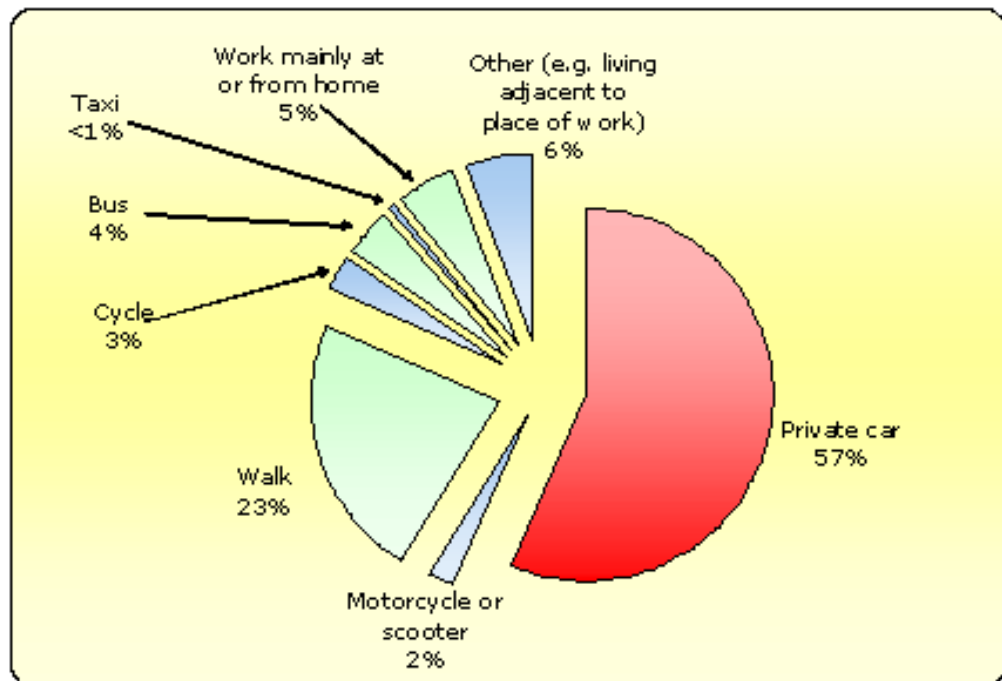
the associated education campaigns, the number of pollution incidents have declined

### Transport

Jersey has the world's highest car ownership ratio, as well as a dependence on air transport for external travel. This results in:

- local congestion and an associated reduction in economic efficiency
- high carbon dioxide emissions which contribute to the greenhouse effect
- localised air pollution that occasionally breaches internationally agreed standards and has risks to health
- the fragmentation of natural habitats by the road networks, airport and harbour development.

The pie chart shows how 57% of the population usually commute to work by private car, whilst only 4% use the bus. We would like to see the numbers of people walking or cycling increase, especially as we have such short distances to travel.

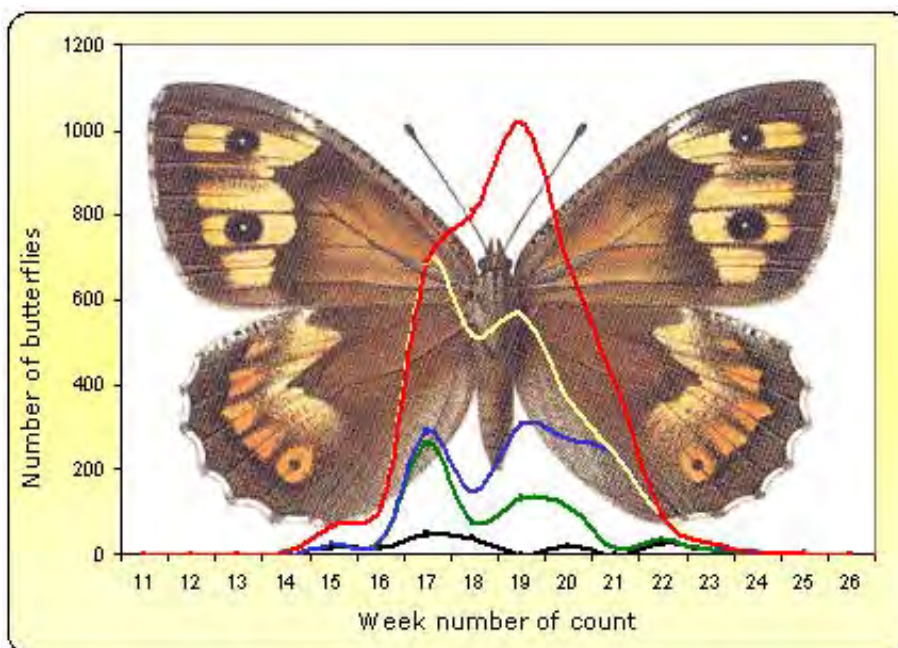


The Island is experiencing declines in the populations of common species such as toads, butterflies and farmland birds like goldfinches.

Evidence shown here (below) uses butterflies which are good indicators of environmental health. Counts at Les Landes mid-season in 1991 (red) and 1992 (yellow) are far higher compared to counts in 2004 (black).

To confirm the actual levels and explain the causes of these declines, we need robust, long-term scientific evidence.

### Biodiversity



### Countryside and Natural History

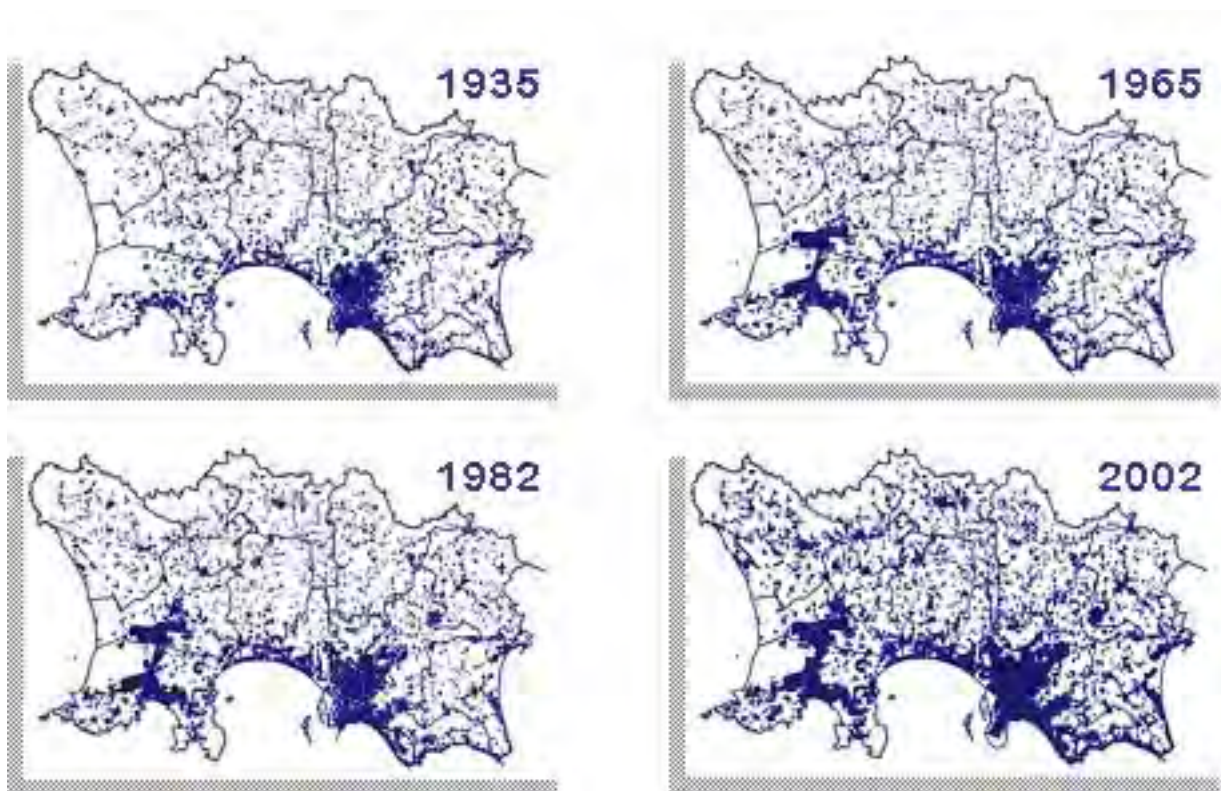
Nevertheless, the main causes of change in marine and terrestrial biodiversity are likely to be:

#### a) Encroaching development.

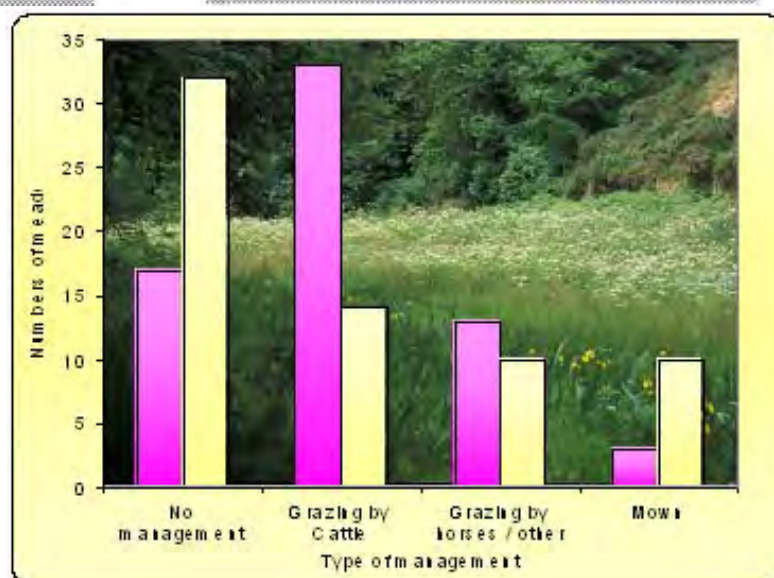
Development of previously undeveloped land causes a gradual sub-urbanisation of the countryside and coastal zone. The maps show how the urban areas (coloured dense blue) have increased substantially since 1935

#### b) Changes through habitat succession.

Although habitats change naturally, man's influence



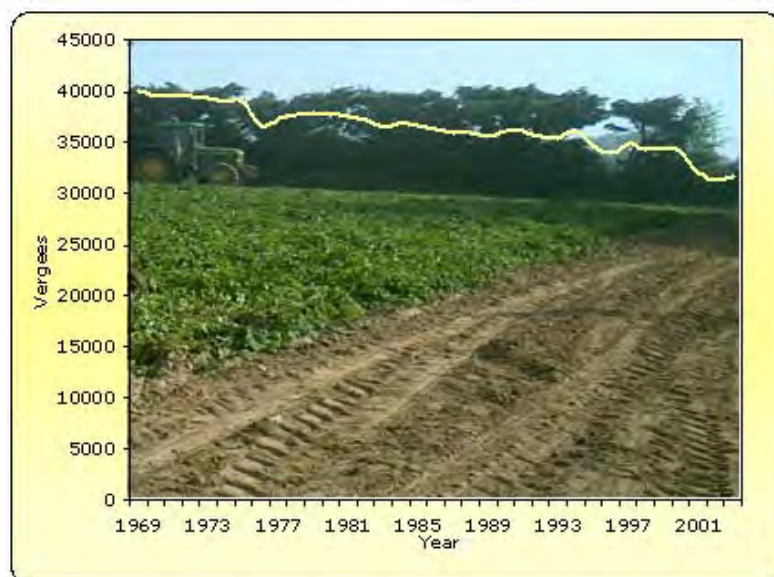
distorts nature's process and continuity. For example, in order for wet meadows to maintain their species richness, they must be grazed. The results of a survey in 1983 are shown (right) in pink and we can see how many meadows were grazed and most had some management. However when repeated in 2003 we can see that far more of the meadows had no management at all and the amount of meadows grazed by cattle had substantially declined. The quality of the flora in these meadows had substantially declined.



### c) Changes in the rural economy

Traditional and long-term management of the countryside gave us today's familiar landscape. But economic pressures and changing practices have led to local water pollution and changes to our traditional methods of land management. We see (right) the reduction in the area of land farmed since 1969 from some 40 000 verges to 31 000 verges. (Verges are a local measure of area; there are 5.6 verges in one hectare.)

Our aim is to be a catalyst for change where this is most needed to address negative environmental trends and





to help prepare the Island for a sustainable future. We are planning to carry out a full review every 5 years and more often (on an interim basis) on trends in the indicators we have identified.

### Six Guiding Principles

We have picked out six guiding principles that will help engender positive change:

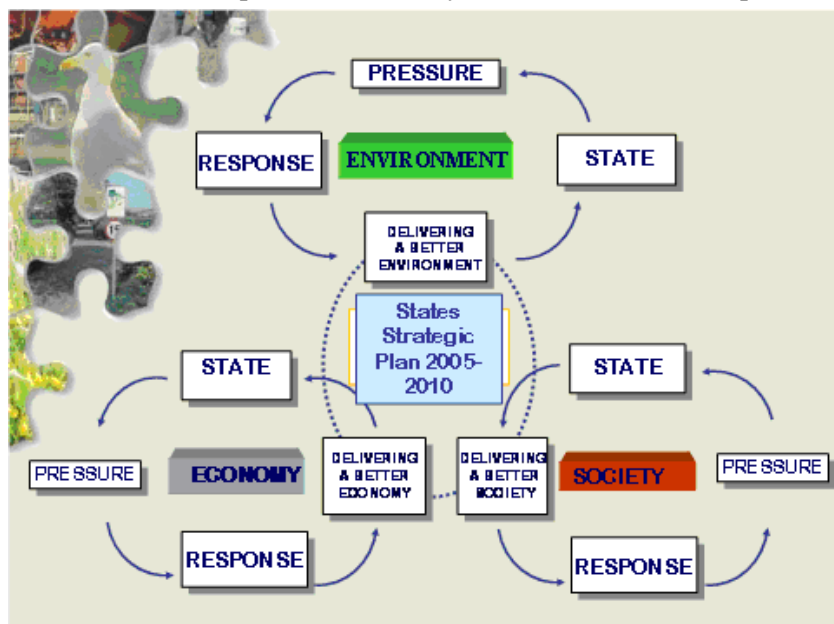
- Back ideals with actions – We aim to provide firm, fair, transparent and effective statutory regulation, taking a precautionary approach. Use fiscal mechanisms to change behaviour if necessary.
- Evaluate our progress – We aim to carry out, and report on, effective environmental monitoring to chart our progress, identify priorities for action and carry out effective management planning to make wise and measured use of public money.
- Work in partnership – We aim to consult, communicate and establish open relationships between organisations, stakeholders and partners to make decisions, target funds and share expertise. This will enable Jersey as a whole to gain maximum social, economic and environmental benefits.
- Educate and empower – The state of our environment is a collective responsibility. To help improve understanding of environmental issues and to foster better environmental practices in all walks of life, we will make environmental information easily accessible for individuals to assess the issues, participate in debate and make better informed personal choices and actions.
- Use finite resources efficiently – We must manage the critical and limited resources of water, soil and land wisely to underpin economic success and health.
- Act now and plan for the future – We must consider the future consequences of our current policies and actions. We must plan to ensure that we pass on our environment to future generations in as good as, or better condition than it is now.

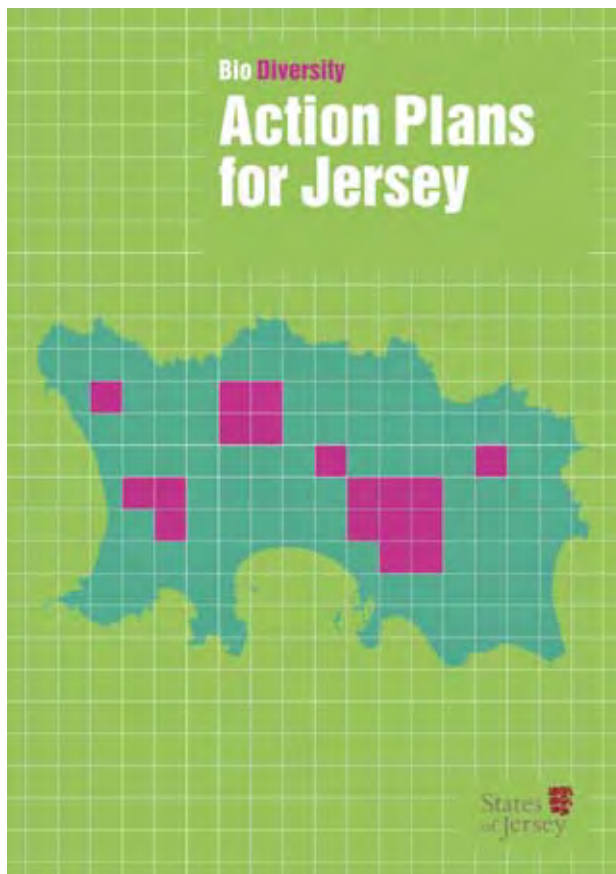
The focus has been on the state of the Environment - which is what you might expect of me given the job I do.

But we cannot just see the environment in a vacuum. Other people see the world from a different perspective and afford greater or lesser priority to environmental issues. There are important issues of social justice, equality and the interactions of society to consider

And we must have a strong economy to be able to afford the environment and society that we aspire to. The resolution of these overlapping objectives is the territory of sustainable development – where we join up choices and policies and make necessary concessions and trade offs with social and political processes. This report has contributed to the *States Strategic Plan* which will guide the Island's development to 2010

Finally, just a quick look at our most recent project, *Biodiversity Action Plans*. The action plans, covering over 50 species aim to get people involved at the very local level. As well as encouraging the organisation of group activities, we are also planning to help people to look after wildlife right outside their front doors. Roadsides in Jersey are mainly cut by the owner of the land, and are inspected twice in the summer. Several of the plants on our list grow on roadside banks and we have recorded significant declines over the last twenty years. One reason for this is the way these banks are cut. They used to be cut by hand, but now machinery is used which can often damage the vegetation. Timing is critical; ideally, the plants should be able to set seed before they are cut. We plan to get people to look after places where these plants grow, perhaps cutting round them by hand. Also Durrell's landscaping department are raising plants from locally collected seed, and we plan to





reestablish plants in areas where they used to grow. Volunteers will then tend them.

## Conclusions

To sum up then, I think the following conclusions can be drawn :

- MEAs are extremely valuable in helping to raise awareness, but also, once an administration has ratified (or had ratified on its behalf), certain responsibilities are accepted giving force to conservation proposals.
- Second, it all takes a long time. Patience, determination and maintaining a sense of humour are essential.
- Third, education is absolutely vital. We have been at it long enough so that school children I spoke to twenty odd years ago now are parents themselves.
- The Pressure – State – Response framework is a powerful framework to develop policy.
- Finally, education leads to community involvement. Government can only do so much. We have always encouraged involvement with

NGOs, and the advantages are clear: informed comment and criticism of policy, lots of work gets done, and it does not cost much. This is important in times like now when budgets and staff are being cut.

## Acknowledgements

I would like to thank Louise Magris, David Tipping and Nina Hall, of the ecology team, for their contribution to the report and to this paper

You can read the whole report and much else about Jersey's Environmental work at:

<http://www.gov.je/PlanningEnvironment/Environment/ReportsPubs/>





# Jersey's Marine Environment

Andrew Syvret, Société Jersiaise

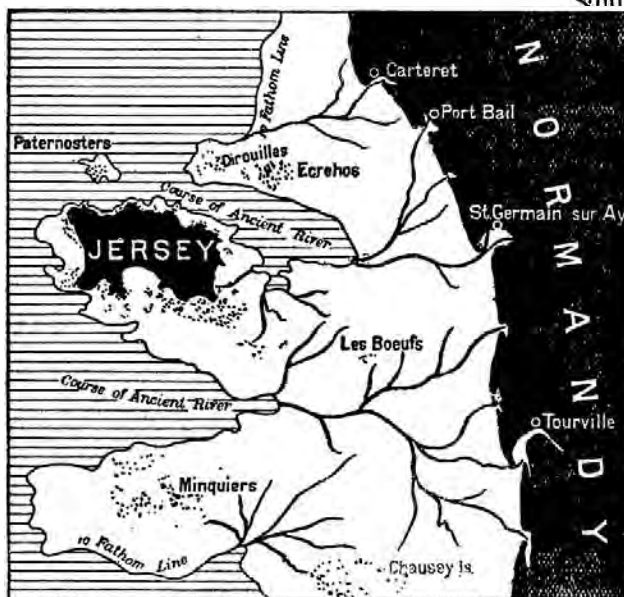
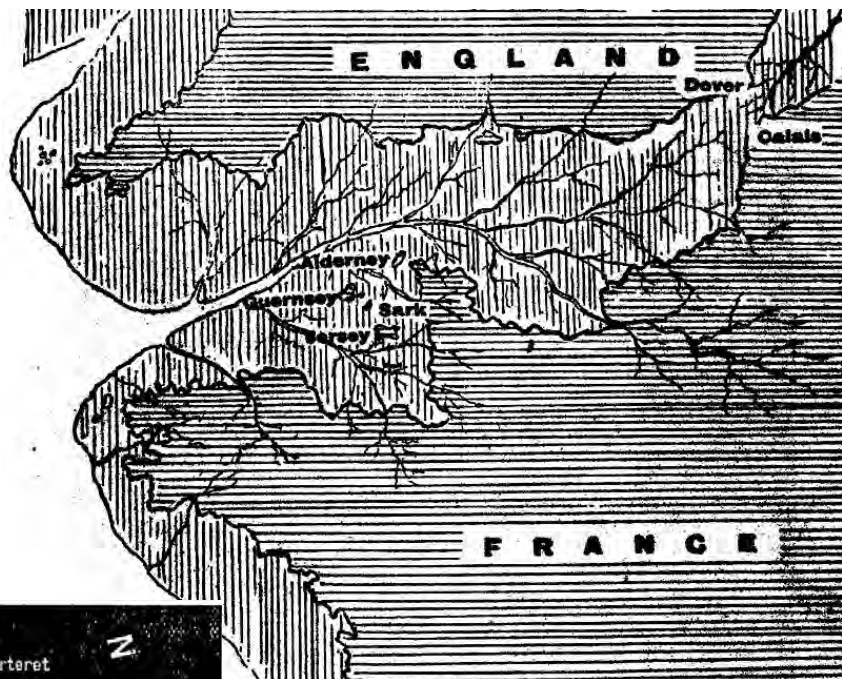


Syvret, A. 2007. Jersey's Marine Environment. pp 38-44 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The Channel Island of Jersey is surrounded by some of the most unusual and valuable marine habitats on the planet. A high-tide land mass of 116 km<sup>2</sup> swells to more than 300 km<sup>2</sup> with low-water spring tides. The Bailiwick of Jersey in its entirety (land and sea) is about 3000 km<sup>2</sup> in extent; therefore, the vast majority of this particular Territory, in common with many others, is marine habitat. With biological records stretching back to the Victorian era, the richness and unique biogeographical significance of Island shores and coastal waters is well known. However, it is frequently poorly acknowledged in proposals for shoreline development. Previous land-claim schemes adjacent to the South East Coast Ramsar site have destroyed and perturbed a globally recognised intertidal environment. In spring 2006, the States of Jersey's Council of Ministers made a strategic commitment to further land-claim south of St Helier.

Andrew Syvret, Société Jersiaise, Jersey. [andrew@seajersey.com](mailto:andrew@seajersey.com)

Jersey is a relatively new island. At glacial maxima, when much water was locked in ice-caps, what are now the Channel Islands were hills in the valley which is now flooded as the English Channel (map to right). Jersey was detached from the continental mainland much more recently than the other Channel Islands, as shown by the later map (below).



Jersey remained connected to France until very recently (about 5000 years ago). As will be apparent, the Island is in a very shallow part of the English Channel.

The Channel Island of Jersey is surrounded by some of the most unusual and valuable marine habitats on the planet. A high-tide land mass of 116 km<sup>2</sup> swells to more than 300 km<sup>2</sup> with low-water spring tides. The Bailiwick of Jersey in its entirety (land and sea) is about 3000 km<sup>2</sup> in extent. Therefore, the vast majority of this particular Territory, in common with many others, is marine habitat and looks



like this at high water:



The huge tides of up to 40 feet (13 metres) range make Jersey a very special place. The offshore



reefs, pictured at here at low-water from the



ground and from the air, are covered and exposed by these tides twice per day. In some cases, tiny islets on the offshore reefs remain exposed at high-water, in a few cases with enough land on which to squeeze a few cottages (as in the picture at the top of the next column).

These reefs are critically important. In recognition



of this, Jersey has arranged to designate several as Wetlands of International Importance under the Ramsar Convention:

South East Coast (designated in 2001) ~ 3202 hectares

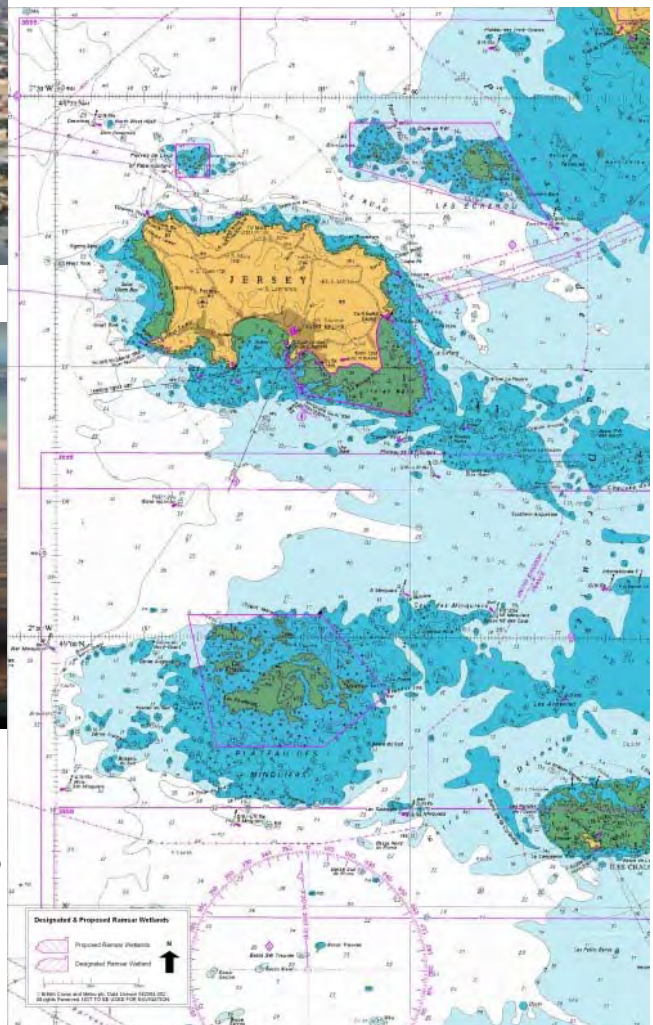
Les Écréhous & Les Dirouilles (2005) ~ 5459 hectares

Les Minquiers (2005) ~ 9575 hectares

Les Pierres de Lecq (Paternosters) (2005) ~ 512 hectares

TOTAL ~ 18748 hectares ~ 187 sqkm

These are shown with red boundaries on the marine chart (below). It is interesting to note that





the total dry land area of Jersey is smaller than the combined area of the Ramsar sites.

The area supports one of the largest breeding popu-



lations of bottlenose dolphins in the British Isles.

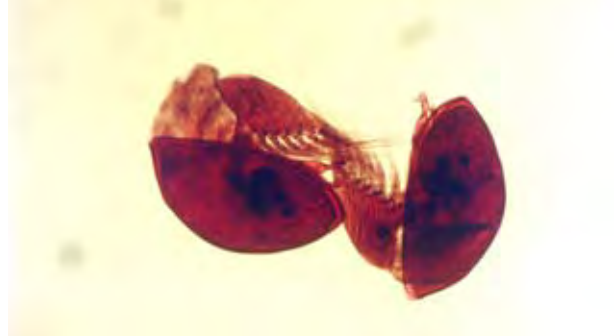
Seals are recovering (despite accidental deaths



from human activity as pictured) and shorebirds, such as this arctic-breeding turnstone are abundant.



Jersey shallow waters are huge incubators; water warmer than surrounding seas in summer and colder in winter. Juvenile lobsters (pictured) and



other species migrate and live within the warmer and shallow waters around Jersey.

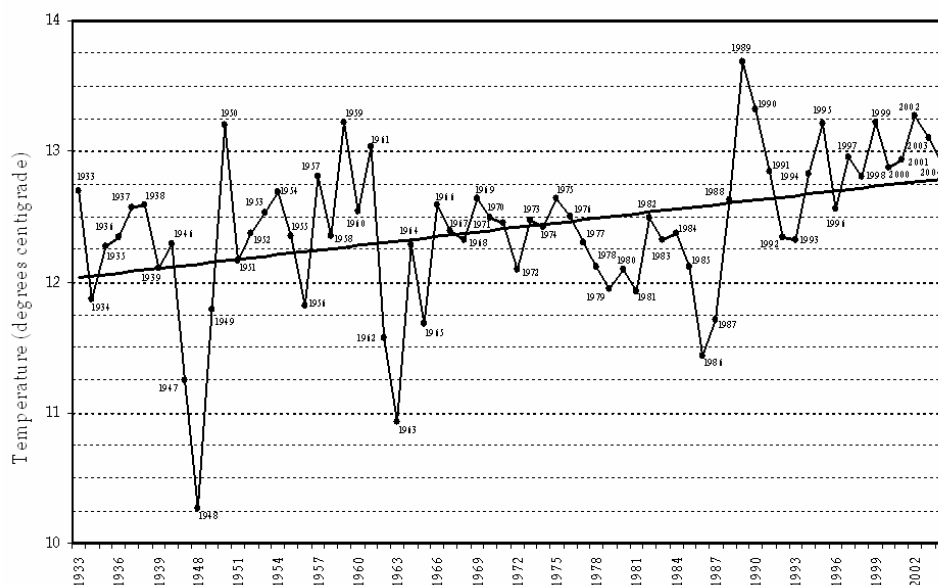
Biodiversity is high; there is no sterile environment in this marine ecosystem - everything is occupied. Ormers have been a robust barometer of seashore health



Populations change; there used to be billions of octopus in Jersey waters, as reported by Joseph Sinel in 1906 with reference to the octopus in Jersey: "Yet another plan, much used in the autumn especially on the north coast of Jersey: in this particular locality and at this time, they sometimes swarm on the sea surface. Men armed with long bamboo rods with large hooks at the end, station themselves on outlying rocks, and simply hook them out as they pass. I have seen many tons weight caught in one locality by this method and being used to manure the land." However, now there are virtually none; they seem to have been killed off by one hard winter.



Mean annual sea temperature ~ St Helier Pierheads ~ 1933 - 2004



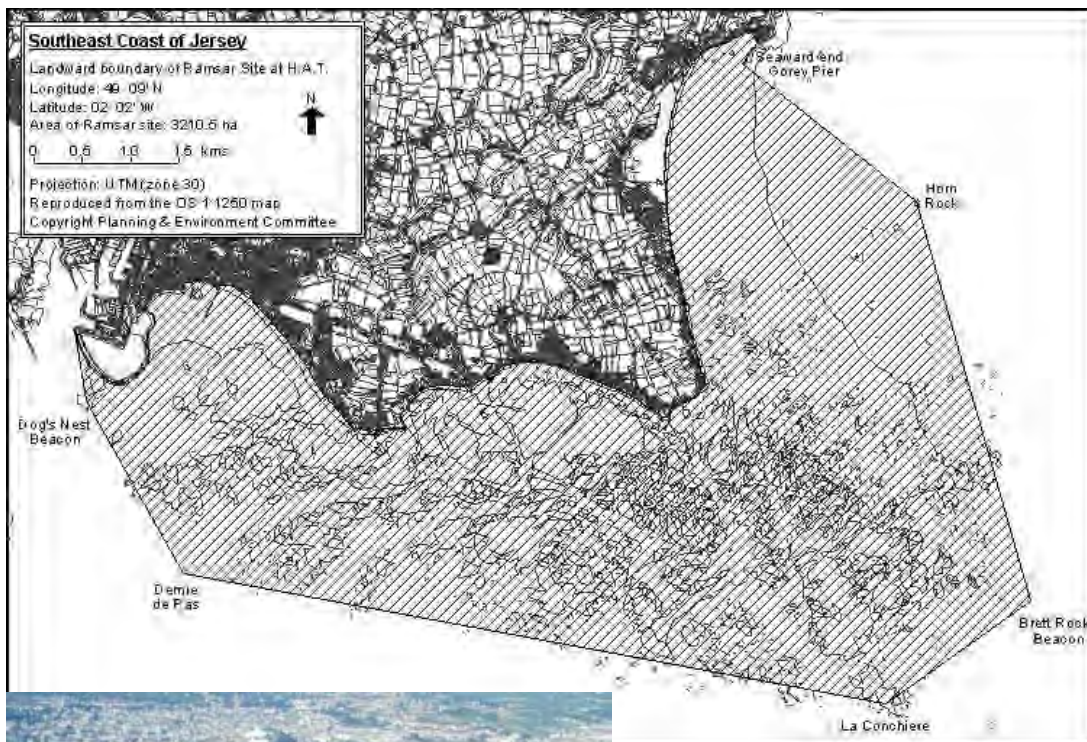
The area lacks a marine research station or even an aquarium. However, there is a good dataset of sea temperatures.

With biological records stretching back to the Victorian era, the richness and unique biogeographical significance of Island shores and coastal waters is well known. However, it is frequently poorly acknowledged in proposals for shoreline development. Previous land-claim schemes adjacent to the South East Coast Ramsar site have destroyed and perturbed a globally recognised intertidal environment. A huge land reclamation project is in progress, using among other things "recycled" glass (see aerial photographs and map of its position relative to the Ramsar site).

In spring 2006, the States of Jersey's Council of Ministers made a strategic commitment to further land-claim south of St Helier. The land-claim site is within the







There are also a large number of other environmental issues that “they don’t tell the tourists about”. These include:  
land reclamation projects (pictures below and at top of next page),



Ramsar site. Land reclamation is a stated priority. Jersey is the site of some of the largest reclamation projects in Europe.







Gorey Marina Proposal  
Société Jersiaise – 4<sup>th</sup> August 2006



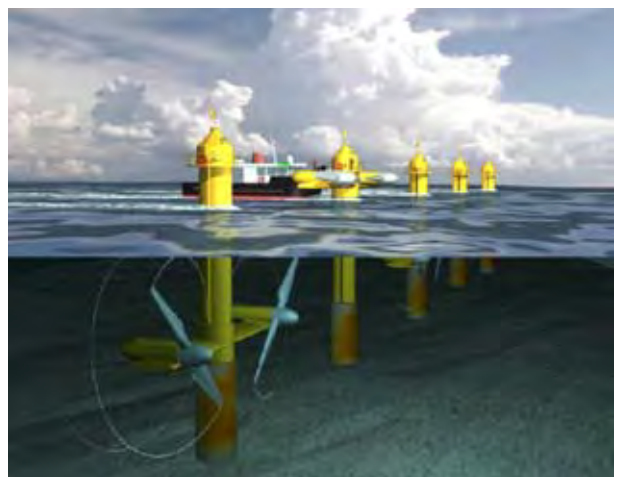
fishery by-catch of cetaceans and other species,



pollution,



marine invasives,  
nuclear reprocessing and technology within close proximity in France and possible contamination,  
novel energy sources, whose impact needs as-  
sessing,



eutrophication from pig-farming , agriculture,  
etc with “red-tide” plankton blooms from time to  
time,

mechanised sand-raking for the beaches destroying food for turnstones



marine recreation posing challenges to eelgrasses.



“On the great attractions of Jersey for the natural-ist, one word will suffice: there is no such spot in England for marine zoology.” George Eliot 1857



## Topic 2: Conservation of the Built Heritage in the UK Overseas Territories

Conservation of the built and cultural heritage is an important component of the work of most of UKOTCF member organisations in the UK Overseas Territories and Crown Dependencies, and is often important also in combination with the natural heritage in both educational and economic activity. The conference included a small but important element on the built heritage, including a key note address by Martin Drury, former Director General of the National Trust [for England, Wales & Northern Ireland] and recently a Council member of UKOTCF. There was also a poster on this topic from the St Helena National Trust. Also within this theme, the National Trust for Jersey kindly hosted a “Vin d’Honneur”, a Jersey tradition, at the Historic Farm at Hamptonne, in the heart of Jersey’s countryside. This served both as a practical example of appropriate uses of historic buildings and as a welcome venue for informal discussions out of the intense programme in the conference. Named after the family who lived here in the nineteenth century, the Syvret building dates from the 1830s and is the most recent of the three houses to be built. The rooms are extremely high and are typical of those found in the large houses being built in St Helier (Jersey’s capital) at this time. This building houses the exhibition *Living Memories* which tells the story of how rural life has changed in the island in the 90 years since the Great War. The northern end of this range of buildings is used as a cider barn and contains an apple crusher, a twin-screw apple press and barrels as well as other farm tools. The cider-making equipment is all in working order and is used every October to produce cider. The photographs below are from this event.



# A Future for Historic Buildings in the UK Overseas Territories

**Martin Drury, formerly Director-General of the National Trust, and former UKOTCF Council Member**



Drury, M. 2007. A Future for Historic Buildings in the UK Overseas Territories. pp 46-49 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

This presentation considers historic buildings in the Overseas Territories and their potential for making a contribution to the local economy. Examples are given of the significant role they can play in attracting tourists. Drawing on the experience of organisations in other countries, this will also show how buildings of historic interest which no longer serve their original purpose can acquire a new, income-producing function through being let for self-catering holidays.

**Martin Drury**, 3 Victoria Rise, London SW4 0PB, UK.  
[martindrury@btinternet.com](mailto:martindrury@btinternet.com)

The theme of this short presentation is that old buildings, even when vacant or dilapidated, are an economic asset. They represent an opportunity, not a constraint. They are good for business and good for the local economy.

It is a great pity that, in the Environmental Charters of the Overseas Territories, so little attention is given to the built environment, which is mentioned only briefly in connection with education. This is a pity because we now know beyond any doubt that people attach as much value to historic buildings as they do to the natural environment. And, it is a pity because the historic buildings in the Overseas Territories I have visited are as precious and, in some cases as rare, as their endemic species and their scenery.

In 2001 a MORI poll entitled What does 'Heritage' mean to you? revealed overwhelming support for the historic environment in England. Here are some of its findings:

- 98% think the heritage is important for the education of children and that all children should be given the opportunity to find out about it.
- 96% think the heritage is important to educate adults about the past.
- 95% think the heritage is important for providing places to see and things to do; 93% for encouraging tourists to visit and 88% for creating jobs and boosting the economy.

- 88% think that there should be public funding for the conservation of the heritage.
- 76% disagree that we already preserve too much.
- 76% think their lives are enriched by the heritage.

Only 2% said they had no interest in the heritage at all. 51% had visited an historic attraction in the previous year, compared to the 50% who had been to the cinema and the 17% who had been to a football match.

Before that poll was taken, it was assumed that only the better-off had any interest in the heritage or any feeling for it. So, it is hugely encouraging to know - and to know for certain - that the heritage

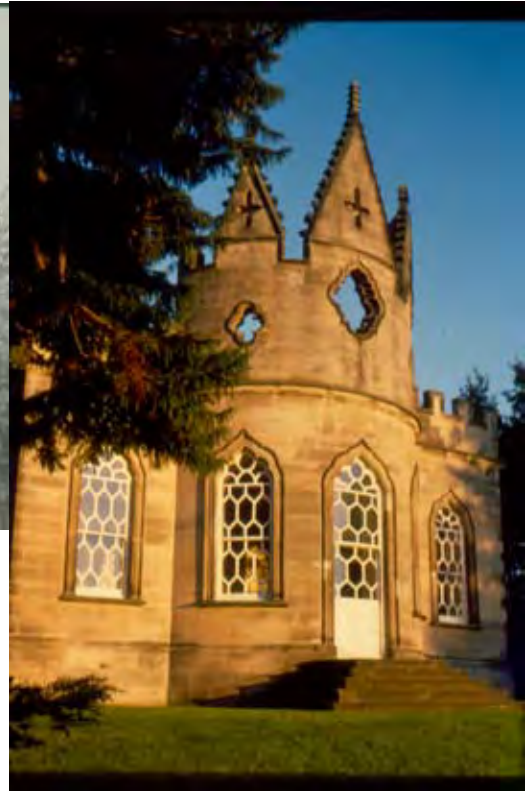


*Kingswear Castle, Devon. Built in 1502 to protect the mouth of the river Dart. One of 185 historic buildings rescued by the Landmark Trust and now available for short holidays.*





*The Banqueting House, Gibside, Co. Durham. Built in 1746 as an eye-catcher in one of the earliest landscape gardens in Britain and seen here before (above) and after (right) acquisition by the Landmark Trust in 1977.*



is highly valued by all but a tiny percentage of the nation as a whole.

Another recent survey, Heritage Works, published in 2005 by a group of commercial developers in association with English Heritage, found that:

- historic buildings provide a focal point that people can relate to and are familiar with;
- the survival of historic buildings distinguishes one place from another;
- historic buildings attract tenants who would not be interested in less distinctive buildings;
- it is nearly always cheaper to repair an old building than to put up a new one;
- an old building or a group of old buildings can play a central part in economic and social regeneration;
- the key to unlocking the economic potential of an old building is to find a viable new use.

One viable new use for an old building is adaption for holiday use. At a time when people - in England at least - work longer hours than ever before,

they attach more

importance

than ever to the time they spend with their families on holiday; they are therefore willing to spend more money on their holidays today than in the past.

In this connection I would like to mention the work of the Landmark Trust. The Landmark Trust was founded in 1965 to rescue small buildings of historic interest that have been abandoned or are at risk and then to repair them and give them new life by letting them for short holidays. Once a building has been restored and adapted in this way, its future is secure because the income from letting pays for its upkeep. It is a simple, but effective model for the sustainable use of old buildings.

Over the years the Landmark Trust has rescued 185 buildings which are now available for renting. They include follies, forts, medieval farm houses, towers built for various purposes, banqueting houses, mills, lock-keepers' cottages, a pig-sty designed to look like a temple, a building in the form of a giant pineapple, a



*The Pineapple, Dunmore, Scotland. After serving as Governor of the Bahamas, the Earl of Dunmore returned to Scotland with pineapples which he propagated under glass. In 1777 he built a summer-house on his estate in the form of a giant stone pineapple, where his guests would assemble to sample the exotic fruit. Leased from the National Trust for Scotland in 1973 and restored by the Landmark Trust as a holiday home for four.*



*The Appleton Water Tower, Norfolk. Built in 1877 to supply water to houses on a large landed estate and incorporating a dwelling for a caretaker. Repaired and adapted by the Landmark Trust as a holiday home for four.*

light-house, a former priory, four Scottish castles and a small prison. All are remarkable in some way - for their architecture, their history or their situation. Many are on the coast or in beautiful country; some are in the heart of historic cities. Most are in Great Britain, but four are in Italy and four in the USA.

‘Landmarks’ are simply furnished with old pieces carefully chosen to fit in happily with their surroundings. Rugs and carpets have generally seen enough use elsewhere to make them agreeable to the eye and the pictures usually have a special



*Old Luffkins, Peak Dale, St Helena. One of several abandoned 18th-century farm houses on the island.*

reason for being there. Each building has its own history album giving an account of its past and its restoration. Books about the neighbourhood and works of literature with local associations are also provided. There are jigsaw puzzles, large-scale maps marking footpaths and a log-book in which visitors record their own discoveries for the benefit of their successors. All Landmarks have modern bathrooms and well equipped kitchens; and some have dishwashers and freezers. All have heating of some kind, where possible including an open fire or stove. Otherwise, intrusive equipment is kept to the minimum and televisions are not provided. In the words of the Landmark Trust’s founder, Sir John Smith, ‘staying in a Landmark is meant to be an experience of a mildly elevating kind’.

On St Helena there are many buildings which would be suitable for adaptation in this way. They would provide an alternative to the small number of hotels on the island and, when the proposed airport is in operation, would be likely to attract visitors who enjoy walking and immersing themselves in the history and culture of remote communities.

On the small island of Salt Cay in the Turks and Caicos archipelago many of the simple wooden houses that contribute to its unique character have been abandoned and lie derelict. They were once occupied by people who operated the sluices and raked salt for the industry, now defunct, which gave the island its name. Salt Cay is more accessible than St Helena, but the economic potential of these buildings for holiday letting is unappreciated and unrealised while the character of the island is gradually eroded by the construction of modern houses that could be anywhere.

The Landmark Trust model is well suited to places with the precious and increasingly rare asset of an



*Salt Cay. Well maintained traditional salt-worker’s house on one of the Turks and Caicos Islands.*





*Salt Cay. Abandoned salt-worker's house.*

unspoiled built and natural environment. These are the places which attract low-volume, high-spending and thus, sustainable tourism.

The Mihai Eminescu Trust in Romania is based on the Landmark Trust. Its work is concentrated in an area of the Carpathian Mountains settled by Germans in the 13th century. In the aftermath of the 1989 revolution most of the population returned to Germany, leaving a group of 17th-century villages set in hill country of outstanding beauty more or less deserted. The aim of the Mihai Eminescu Trust is to reinvigorate the economy of the villages by attracting tourists without damaging the combination of traditional architecture and fine landscape that distinguishes this remote and beautiful region of Eastern Europe.

The Trust has bought houses in several of the villages, repaired them and introduced modern amenities. They are now available for holidays. The repairs are carried out by some of the few



*Seventeenth-century farm houses lining the main street of Viscri, Romania, one of the villages deserted by the German-speaking population in 1989. The Mihai Eminescu Trust has restored several houses which can now be rented for holidays. The Mihai Eminescu Trust runs courses for young people in the repair and maintenance of historic buildings.*

young people who survived the exodus, supervised and trained by experts from the United Kingdom who treat the experience as a holiday and make no charge. The Landmark Trust has helped by disseminating information about the work of the Mihai Eminescu Trust among the 120,000 people on its database.

In repairing and maintaining old buildings it is essential to use the techniques and materials that were used in their construction. Principally, this means using lime rather than its hard and impervious modern equivalent, Portland cement. Lime is no more expensive than cement and, once the skills are learned, the work takes no longer to complete. An old building properly repaired and maintained will last indefinitely; use of the wrong materials and techniques will cause constant trouble.

There are four principles which, if followed, will preserve the character and thus, the value, of an old building at minimum cost:

- use lime mortar;
- never replace when it is possible to repair;
- if it is not possible to repair, replace like with like;
- do a little maintenance every year and thus avoid major expenditure every ten years ('little and often').

In conclusion, buildings constructed before the advent of modern communications are a diminishing resource in the world. Whatever their condition, old buildings are an economic asset with the potential to help in the regeneration of local economies. A proven way of realising this potential is by letting them for holidays, but their value will only be sustained if they are repaired and maintained using traditional materials and techniques.

# Poster: St Helena Historic Houses and Sites: What Future?

Cathy Hopkins, St Helena National Trust

Hopkins, M.C. 2007. St Helena Historic Houses and Sites: What Future? pp 50-52 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

This presentation considers historic buildings in the Overseas Territories and their potential for making a contribution to the local economy. Examples are given of the significant role they can play in attracting tourists. Drawing on the experience of organisations in other countries, this will also show how buildings of historic interest which no longer serve their original purpose can acquire a new, income-producing function through being let for self-catering holidays.

**St Helena National Trust**, Broadway House, Main Street, Jamestown STHL 1ZZ, St Helena. [sth.nattrust@helanta.sh](mailto:sth.nattrust@helanta.sh)

## St Helena Historic Houses and Sites: What future?



Woodcot: Privately owned property, well maintained. Early 19th Century with later addition of a porch.



This fairly recent rebuild of an old country house is an example of what can be done when money is available- unfortunately, all too often buildings have been allowed to fall into ruin. Modern bungalows are replacing a rich legacy – how can we stop this?



Plantation House: restoration work and new roof funded by FCO



Longwood House: French property, well maintained as a museum by the French Government.



General Bertrand's Cottage 2002. Since then the shutters have been removed by Government and not replaced. The roof was re-tiled with FCO funding. The Trust is seeking an agreement with Landmark Trust and SHG to lease the property for residential tourism. However, no funding is available for restoration work.





A view of Main Street in the early 1900s -Note the spire on St James' Church and the beautifully proportioned Georgian frontages of the houses.



View of Main Street early 1960s – the addition to the hotel and intrusion of electricity poles & wires. Loss of fountain.



Hutts Gate Store in early 1960s. Built on site of earlier 17<sup>th</sup> century building, the current cottage dates back to the 18<sup>th</sup> century.



Hutts Gate 2006: lack of funding to restore this building sees it gradually falling into ruin. A grant scheme would help owners to maintain and restore historic buildings.

Rock Rose some 20 yrs ago,  
now a virtual ruin – private ownership



Houses with a special history- Teutonic Hall where Napoleon took tea, rapidly falling into ruin; the other Wellington House, maintained as a hotel.



This photo taken in the 1960s shows commercial buildings near the Market – the shutters became dangerous and were removed rather than repaired.



Luffkins – a plantation house shown in 1970s and since 2002. Private ownership.



Banks' Battery looking out to sea.



Repuise Point and Friar's Ridge – the coastal fortifications attract local and visitor interest despite the difficulties of accessing them and their condition.



- The Environment Charter 2001 commitment Number 9 states that the St Helena Government will
- "Encourage teaching within schools to promote the value of our local environment (natural and built) and to explain its role within the regional and global environment."
- The government of the UK will under its commitments Numbers 8 & 9
- Use the existing Environment Fund for the Overseas Territories, and promote access to other sources of public funding, for projects of lasting value to St Helena's environment.
- Help St Helena identify further funding partners for environmental projects, such as donors, the private sector or non-governmental organisations.
- How does HMG justify a commitment to valuing the environment when the funding criteria under OTEP is limited to the natural environment and the "other sources of funding" have not been identified since the Charter was signed in 2001.

- SHNT has developed a project with SHG to bring volunteer archaeologists with a specific expertise in built heritage, to train local Government and NGO personnel in recording of historic buildings and sites and, at a later stage, to offer "hands on" training in restoration techniques.
- Funding remains the key element to restoration and conservation of our built environment – few owners of historic houses (including Government) can afford to maintain them.
- We wish to develop a grant/ revolving fund scheme to support owners in maintenance / restoration work.
- We believe that OTEP criteria should be widened to include the built environment. We seek the support of other Overseas Territories in asking for this change to the criteria OR
- That FCO/DFID should pro-actively assist St Helena to find alternative sources of funding
- Help us to help ourselves and save our built heritage from further "decline and fall".

Prepared by A/011 September 2008



## **Topic 3: Environment Charters and strategic planning**

**Session Organiser: Dr Mike Pienkowski, Chairman, UK Overseas Territories Conservation Forum**

The central purpose of this session was to review, and help, progress by both UK Government (HMG) and the UK Overseas Territories and Crown Dependencies in implementing the Environment Charters or their equivalents. This general subject is relevant to all UKOTs and CDs (whether or not they have Environment Charters) because of the shared commitments by HMG and the territories to multilateral environmental agreements.

The Charters provided for UK Government and most of the UKOTs a structure to help implement the joint responsibilities, notably via a set of Commitments each party made. A preliminary assessment of progress in fulfilling these commitments was included in the conference papers and summarised in the presentations. The version included in these Proceedings is the result of further collation undertaken with the help of many of the conference participants and their colleagues.

At the Bermuda conference in early 2003, the Environment Charters were 18 months old. 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 was 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 was given, and it was intended that an update on progress on implementation would be given at this conference. Unfortunately, TCI Government cancelled Michelle Fulford Gardiner's participation but the abstract of what she was going to say is included. St Helena was the first territory to try to apply the TCI model, and Cathy Hopkins reported on progress. The Falkland Islands had taken a different approach to developing implementation, and this is outlined by Dominique Giudicelli. Karim Hodge described progress in Anguilla, as an example of integrating Environment Charter implementation with that of the equivalent St Georges Declaration of the Organisation of Eastern Caribbean States. Jennifer Gray described the very full approach via Bermuda's biodiversity strategy implementation, while Simon Glass looked at the approach by a territory with a very small human population. Roland Gauvain looked at strategic planning in a Crown Dependency, which does not have an Environment Charter - but perhaps would like one. Liz Charter took a wide view of multilateral environmental agreements in respect of UKOTs/CDs, identifying needs for further guidance.

The final sub-session was devoted to summaries from the Foreign & Commonwealth Office, the Department for International Development, the Department of Environment, Food & Rural Affairs, and the Joint Nature Conservation Committee of their contributions to conservation in the UK Overseas Territories and Crown Dependencies. This was followed by a final panel discussion with this team. The discussions throughout the session have, in some cases, been incorporated in papers and/or are summarised in the final item in this topic section.

# Review of the progress of implementation of the Charters, based on current work to develop a system to monitor this

**Dr Mike Pienkowski, UKOTCF**



Pienkowski, M. 2007. Review of the progress of implementation of the Charters, based on current work to develop a system to monitor this. pp 54-72 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

A review developed from the initial model, published in *Forum News* in late 2005, of progress in implementation of the Environmental Charters or their equivalents, was presented in the conference papers and summarised in the session, with the emphasis on the need to make this more complete. Conference participants agreed on the importance of this, and requested further help to them in supplying information to the review, so that the version published here could be more complete. This was done, so that the tables included give a useful picture of the implementation by the Territories of their Commitments. This helps also identify the gaps of information or implementation by these, as well as by the UK Government of its Commitments under the Charters, where more information is especially needed.

**Dr Mike Pienkowski**, UK Overseas Territories Conservation Forum, 102 Broadway, Peterborough PE1 4DG [pienkowski@cix.co.uk](mailto:pienkowski@cix.co.uk)

## Background

The Environment Charters signed in September 2001 between the UK Government and the Governments of UK Overseas Territories (UKOTs) are important documents which encapsulate the shared responsibility of the UK Government and the Government of each Territory for the conservation of the environment in the UKOTs and international commitments to this. This is particularly important, for example for biodiversity, as most of the global biodiversity for which the UK family of countries is responsible resides in the UKOTs, rather than in Great Britain and Northern Ireland. Under Multilateral Environmental Agreements, it is UK which lodges – and is accountable for – international commitments, but the legislature and executive of each territory which are responsible for the local implementing legislation and its enforcement. This latter point applies equally to the relationships between UK and those territories which do not have Environment Charters.

Fundamental elements of the Charters are the sets of Commitments, on the one part by UK Government and on the other part by the Government of the UK Overseas Territories concerned. If these Commitments are to have real meaning, it is necessary to have some means of assessing progress in their implementation. This need has been recognised by the UK Overseas Territories Conservation Forum (UKOTCF), which has been putting consid-

erable effort into developing a set of measures to achieve this end.

This need was recognised too by the OTEP management team. One of UK Government's Commitments in the Charters concerns providing some funding to help benefit the environments of the Territories. Initially, this was met by the Foreign & Commonwealth Office (FCO) Environment Fund for the Overseas Territories (EFOT), and currently by FCO's and the Department for International Development's (DFID) joint Overseas Territories Environment Programme (OTEP). Accordingly, part of the work of assessing progress was supported by funding from OTEP. Some in the UKOTs have expressed concern that this might mean that one party to the Charters (UK Government) might have special access to the assessment process. It is important to emphasise that this is not the case. UKOTCF has retained editorial control over this exercise, and will continue to do so. Whilst it welcomed the part-funding from OTEP, and any input from either party to each Charter, as well as others, UKOTCF will retain its independent position. UKOTCF originally suggested the idea of the Charters (then termed "Checklists") and was delighted when this evolved into the Charters. It has continued to support this process, but it is not a party to the Charters, nor either set of Commitments. This combination puts UKOTCF in an ideal position to provide assessments of progress in implementation.

UKOTCF has been asked by various people in the UK and the UKOTs, including FCO and DFID, to attempt to gather, collate and analyse information on progress being made in implementing the Environment Charters. However, developing a set of measures or indicators is not simple. This was challenging because UKOTCF had not drafted the Charters, which are not structured in a way that made assessment of progress easy. The key was to find measures which related to real progress in meeting the Commitments but would not require too much effort to gather. UKOTCF put a great deal of work into consulting and working on this, and published its draft measures in *Forum News* in early 2006, inviting further comments and contributions to help populate the tables of assessment measures. No adverse comments were received on these measures, and some favourable comments on them were received from JNCC, HMG's statutory advisor on nature conservation. For elements of some Commitments, it is relatively easy to find appropriate and meaningful measures; for others it is very difficult. UKOTCF does not want to generate unnecessary work, and recognises also that some relevant information has already been made available (and is updated regularly) for other purposes. In other cases, cumulative measures, updated every few years, might be more feasible. UKOTCF has tried to allow for both sorts of measures, so as to minimise effort and be cost-effective.

### **Progress at and after the conference**

Recognising that it is much easier to comment on a draft than to start from a blank sheet of paper, UKOTCF presented the version of data collated by then in the papers for this conference. A summary of this information was presented in the session. This underlined the need for more information from all parties to allow the completion of these measures, to avoid the otherwise inevitable confusion between "no information" and "nothing achieved".

UKOTCF took the opportunity to invite further contributions and enquired whether there were blockages which could be addressed. There was general agreement from UKOTs over the importance of Territories and other parties supplying information to update the initial assessments. There were also requests to UKOTCF to provide forms designed more for the supply of information than for summarising the results, so that the version of the report published in the Proceedings (this paper) could be more complete. This new form was de-

signed and circulated by UKOTCF early in 2007.

The important function of collating this information was made even more urgent by the investigation in early 2007 on *Trade, Development and Environment: the role of the FCO* by the House of Commons Select Committee on Environmental Audit (EAC, Report 23 May 2007). When preparing supplementary evidence to address questions put to their Minister by the Committee, FCO officials asked UKOTCF about progress on its review on implementation of the Charters. Subsequently, the FCO Minister's supplementary memorandum to the House of Commons EAC stated (with a slightly optimistic interpretation of UKOTCF's estimate of the timescale): "Your Committee also asked about an assessment of the Overseas Territories Environment Charters. The UKOTCF is currently gathering information on the progress in implementing the Environment Charter Commitments for each Territory (or the equivalent for those Territories without Charters). The Forum intends to publish a progress report towards the middle of this year. The FCO will use that information, in consultation with Whitehall colleagues and the governments of the Overseas Territories, to carry out a review of the Environment Charters which have now been in place for five years."

In this context, UKOTCF put a great deal of further effort into helping and encouraging UKOTs to provide information, stressing that it was not necessary for each to answer all the questions. However, it was difficult simply to cut out some areas of the form, because of the structure of the Charters and the fact that different territories had made progress at different rates in different areas. For efficiency of collation and reporting, those territories without Charters were also invited to participate in the exercise. The information gathering forms have been designed so that, after the initial hard work in this first cycle of reporting, any subsequent updating report will not require as much effort.

### **Acknowledgements**

UKOTCF is grateful to all those who assisted and commented on the development of the progress assessment measures, and to OTEP for part support for some of the earlier stages of the work. The contributions of those who supplied information on progress was, of course, essential and UKOTCF gratefully acknowledges this. Some of the bodies which had originally asked UKOTCF to undertake this review circulated other questionnaires



to UKOTs as the UKOTCF exercise was moving towards completion. This was confusing to the UKOTs and generated extra work. UKOTCF regrets this, but has to note that it was not consulted about these circulations from other organisations.

UKOTCF is very pleased to note that, of the 21 entities that constitute the UKOTs and Crown Dependencies, responses have been received from or on behalf of 19. In line with the Environment Charters themselves, responses were welcomed from both governmental and non-governmental bodies and, in several cases, the responses were integrated. We are grateful to the governmental departments and/or the statutory bodies of the following for their responses: Bermuda, the Cayman Islands, the Turks & Caicos Islands, the British Virgin Islands, Anguilla, Montserrat, Ascension Island, St Helena, Tristan da Cunha, the Falkland Islands, South Georgia & the South Sandwich Islands, and the Pitcairn Islands, as well as from the governmental departments from the following Crown Dependencies which do not have Environment Charters: the Isle of Man and Jersey. We are grateful too for contributions from non-governmental bodies in some of these, as well as for: British Indian Ocean Territory, Gibraltar (which has its own Environment Charter, rather than one with HMG), Guernsey, Alderney and Sark.

UKOTCF has not received information from HMG in respect of the UK Commitments in the Environment Charters, nor from those UKOTs which are directly administered by UK Government: British Indian Ocean Territory, British Antarctic Territory, and the Cyprus Sovereign Base Areas. The first of these has an Environment Charter (and UKOTCF is grateful to the NGO Chagos Conservation Trust for supplying some relevant information), and the other two do not. Officials at the Cyprus SBAs indicated that they hoped to find time to supply information but were not able to treat it as a priority; UKOTCF hopes that they may still be able to undertake this exercise, in which case UKOTCF will add information to the report. The lack of information from HMG on its own Commitments means that the second half of the report (below) is extremely incomplete, relying on information supplied by the territories or otherwise gleaned. Early in 2007, HMG indicated initially that there would be a delay in its response. A few months later, FCO reported that, although it had no problem in principle with the indicators, HMG did not have the resources to report on the implementation of its own Commitments. UKOTCF was surprised by

this, because HMG had drafted the Environment Charters, had been one of those originally asking UKOTCF to develop a report on their implementation, had reported nothing wrong with the draft indicators published in early 2006, and had (around the same time as indicating that it could not find the time to respond) reported to Parliament that it was awaiting UKOTCF's report. UKOTCF hopes that HMG will identify the resources to report on its Commitments in the future. In the interim, UKOTCF (despite its much smaller resources) will continue to try to collate any available information on this.

### **Report on progress in implementing the Environment Charters or the equivalent activities**

The following table is structured according to the numbered Commitments by HMG and by most of the UKOTs in the Environment Charters that these have signed. (There are slight differences in the wording of some Commitments in different Charters; here generalised wording is used.) The inclusion of a territory in this table does not imply that it has signed an Environment Charter with the UK. In particular, the Crown Dependencies, the Cyprus Sovereign Bases Areas, and the British Antarctic Territory do not have Environment Charters, and Gibraltar has one of a different type, being a statement by Gibraltar rather than an agreement with HMG. However, the progress report has wider purposes. UKOTCF, at the request of various UK Government Departments and others, often needs to collate information on the UKOTs and Crown Dependencies (CDs). All UKOTs and CDs are included in the tables, for this reason and for efficiency of data-handling.

Because of the major collation exercise involved, the different ways different territories operate, and the problems noted above, this report will inevitably include some errors. UKOTCF welcomes information to correct errors or fill gaps. This should be sent to the email address below. In addition, especially for those Commitments where indicators are particularly difficult to develop, some measures include an element of interpretation, and there is a risk that these have been interpreted differently in different territories. Wherever possible, it has been attempted to move towards a common standard for all on the basis of more detailed information, but some inconsistencies in individual indicators probably remain.

# Notes on the tables:

For those Territories without an Environment Charter, references to the Charter in certain measures are taken as referring to equivalent provisions.

Y = yes; B = yes, for biodiversity aspects only; P = partly; D = apparently in place but some problems identified in practice; Rev = under active review; N = no; ? = unknown; n/a = not applicable  
£k = thousands of GB pounds; £m = millions of GB pounds

UKOTCF recognises that this document is not exactly a "good read", but the information it contains is important. To try to ease its inspection, a colour code is used for those rows which relate to extent of environmental performance. For example, using the abbreviations indicated above, this might appear as:

Y B P D Rev N ?

The colouring is applied similarly for other types of answers. Rows which relate to information not directly reflecting performance (for example, those needed to help calculate or interpret other rows) are not coloured. Also not coloured are rows where the information is inadequate to allow an assessment.

Footnotes are used for further explanation.

## Measures of performance of UKOTs in implementing their Commitments in the Environment Charters (or equivalent environmental progress for territories without charters)

Commitment (The government of the Overseas Territory will:)	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S. Georgia & S. Sandwich Is.	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey ( & Sark )	Alderney	Sark <sup>1</sup>
Named Environment Charter	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	Rev <sup>2</sup>	N
Group assembled to develop and manage strategy for action	2	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Rev	n/a	n/a	n/a	n/a	Y	n/a
Strategy for action developed	2	B rev	Y	Y	Y	Y	P	Y	B	Y	Y	Y	Y	Y	Y	Y	Rev	W	B	Y	
Named Minister or Councillor responsible for carrying the implementation forward and ensuring reporting on progress	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	n/a	Y	Y	Rev	Y	Y	n/a	n/a	n/a	Y	n/a
Named officials designated and resourced to coordinate across	2	Y	Y	Y	Y	Y	Y	Y	Y	Y	n/a	Y	Y	Y	Y	Y	n/a	n/a	n/a	n/a	n/a

Commitment (The government of the Overseas Territory will:)	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey ( & Sark) <sup>1</sup>	Alderney	Sark <sup>1</sup>
Measures																					
departments and other partners, draft annual reports																					
NGOs resourced by Government to provide an independent monitoring and reporting mechanism																					
Strategy implemented and monitored as ongoing process	P		Y		Y	P	Y	Y	P		Y			Not yet					Y	n/a	
Annual reports produced on progress achieved and plans for the forthcoming year	2		Y		Y	Rev	Y			P				Not yet					Y	n/a	
Funding for recurrent expenditure and projects to implement the Charter: strategy included in annual departmental budgets	P		P		P	P	Y	P	P	Y	Y			Not yet	n/a		n/a			n/a	
Amount expended in year on Environment Charter implementation from Territory resources (£k)	\$15 m pa on initial supp ort		?							164				0			Y		n/a	n/a	
2002-3								4	98	232				0			Y				
2003-4								10	84	190				0			Y				
2004-5								13	107	177				0			Y				
2005-6									125								567				
2006-7																					
Local funding mechanism in place in support of non-governmental projects implementing the Charter (e.g. earmarked visitor tax)	Y	P	Y		P	Rev			Y	Y										n/a	
Grant funding system in place for any such local funding mechanism, involving open processes and NGO involvement in decision process			D			Rev			P	Y										n/a	
Amount collected in such fund		n/a	?	n/a	0	0	0	0	Curr hold £6k	134	n/a			n/a	0		0		n/a	n/a	
2002-3										117											
2003-4										90											
2004-5										87											
2005-6																					
2006-7																					
Amount expended on Environment Charter objectives by such fund		n/a	?	n/a	0	0	0	0	n/ avail	134	n/a			n/a	0		0		n/a	n/a	
2002-3										117											
2003-4										90											
2004-5										87											
2005-6																					
2006-7																					



Commitment (The government of the Overseas Territory will:)	Measures																			Sark <sup>1</sup>
	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey (& Sark)	
2. Ensure the protection and restoration of key habitats, species and landscape features through legislation and appropriate management structures and mechanisms, including a protected areas policy, and attempt the control and eradication of invasive species.																				
Number of nature protected areas designated	?	4	24	20	6 <sup>a</sup>	4	1	(15) <sup>a</sup>	3	?	1		6	0	2	1	12	10	?	?
Area (km <sup>2</sup> ) identified as nationally or internationally important for nature	95	97	870	318	81	63	108	36.0	179	1726	4033	4050	0	87	?	24	36	204	11.1	157
Area (km <sup>2</sup> ) of nature protected areas designated	5.07	1.32	773	7.48	0	12	9	0	93	180	3755	ca 400	ca 400	37	?	22	9.43	191	11.1	157
Area of nature protected areas as % of area identified as nationally or internationally important for nature	5.3	1.0	89	2.4	0	17	8.3	0	52	10	93	?	?	43	?	90	26	93	100	100
Land area of territory (km <sup>2</sup> )	53	260	430	153	90	102	90	122	181	1217	4033	170	?	44	6.5	254	872	117	62	8
Area (km <sup>2</sup> ) of terrestrial nature protected areas	5.07	1.32	35	4.38	0	12	9	0	93	180	3755	?	?	37	?	22	9.4	4	ca 10	?
Area of terrestrial nature protected areas as % of land area	9.6	0.5	8.1	2.9	0	11.8	10	0	51	15	93	?	?	83	?	8.7	1.1	3.4	16	?
Land and sea area of territory (km <sup>2</sup> )												5440	0							
Area of all nature protected areas as % of land and sea area												0.08								
Area (km <sup>2</sup> ) of designated nature protected areas subject to operating management plan <sup>b</sup>	?	?	?	?	0	0	0	0	79	27	3755	?	?	37	0	0	?	191	11	157
Change in area (km <sup>2</sup> ) of nature protected areas since Environment Charter signed (Sept 2001) (Positive except as indicated)	0.5 <sup>c</sup>	0	0.5	0.14	0.5	0	0	0	44	0	0	0	0	0	?	22	1.61	157	3.9	157
Number of nature protected areas improving in nature quality since Sept 2001				1				1	3	18 <sup>d</sup>				n/a						
Number of nature protected areas maintaining nature quality since Sept 2001			18			2			All					n/a						
Number of nature protected areas with declining nature quality since Sept 2001		all	5	1		2 <sup>15</sup>			0	0				n/a						
Number of nature protected areas with no information on changes in quality since Sept 2001										0	1			n/a				10		
Government bodies (G) and/o NGOs (O) involved in managing protected areas	GO	GO	GO	GO	GO	GO	G	GO	GO	GO	G	G	G	n/a	GO	G	GO	G	GO	GO
Number of key species with conservation action plans developed and completed or being implemented	68	39	5	1		1	1	6		12				3	0	?	3	50	0	Rev
Number of species with reduction in threatened status	1	1	1	0	0	0	0	0	1	22	0	0	0	2	0	0	0	0	0	
Number of species with increase in threatened status			1							?	?	?				?	?	?	?	
Review completed identifying gaps in legislation and needs to fulfil them to meet nature commitments	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	?	?	Y	Y	?	Y	Y	Y	N
Legislation updated to fill gaps in nature protection	0	N	Rev	Y	Y	Rev	Y	Y	Y	Y	Y			Y	Y		Y	n/a	Y	N



Commitment (The government of the Overseas Territory will:)	Measures																				
	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey (& Sark)	Alderney	Sark
Review completed of invasive species problems	Y	P	P	P	Rev	P	Y	P	P	Pending					Y			Y	Y	Rev	
Action plans completed or operating to deal with invasive species	P	S		P		P	P	Rev	Y	Y				1			Rev			n/a	
Review completed of threats posed by potentially invasive species	P	P		P		P	Y	P	P	Y				Y			Y				
Effective measures in place to prevent arrival of further invasives	P	P	D	P	Rev	D	P	P	Rev	Y				Rev			P				
3. Ensure that environmental considerations are integrated within social and economic planning processes, promote sustainable patterns of production and consumption within the Territory.																					
All Country Plans and strategic plans refer to the Environment Charter and its Commitments	P	P	P	P	Rev	Y	P	Y	Y	Y	Y			Rev			n/a	n/a	n/a	Rev	
Have environmental considerations been integrated into social and economic planning processes, and are activities undertaken in sustainable manner in the following sectors:	P	P	D	P	P	Rev	P		P	Y	Y			Rev	Y						
Waste management	P	P	Rev	P	P	D	P	Rev	P	Y	Y			Rev	Y						
Water resources management	P	P	D	P	P	P	P	Rev	P	Y	Y			Rev	Y						
Tourism	Y	P	D	P	P	P	P	Rev	P	Y	Y			Rev	Y						
Transport	P	P	D	P	P	P	P	Rev	P	Y	Y			Rev	Y						
Public and private land use	P	P	D	P	P	P	P	Rev	P	Y	Y			Rev	Y						
Taxation & Economic	Y	P	D	P	P	P	P	Rev	P	Y	Y			Rev	Y						
Fishing	P	P	D	P	P	P	P	Rev	P	Y	Y			Rev	Y						
Farming & Forestry	Y	Y	P	P	P	P	P	Rev	P	Y	Y			Rev	Y						
Mineral Extraction	Y	Y	D	P	P	P	P	Rev	P	Y	Y			Rev	Y						
Power Generation	Y	Y	D	P	P	D	P	Rev	P	Y	Y			Rev	Y						
Traditional Crafts	P	P	P	P	Rev	Rev	Rev	Rev	P	Y	Y			Rev	Y						
others	P	rev	P	P	P	Rev	Rev	Rev	P	Y	Y			Rev	Y						
4. Ensure that environmental and environmental health impact assessments are undertaken before approving major projects and while developing our growth management strategy.																					
ELAs required on development projects	D <sup>17</sup>	P	D <sup>17</sup>	Y	N <sup>15</sup>	D	P	P	Y	Y	Y			D <sup>17</sup>	Y			Y	Rev	infor mal	
Number of proposed or active development projects	4	man y	Man y	6	10+	6	7	11	3	3	2		7	1	4	7	3	7	7	2	
Number of these with publicly available ELAs	6	0	D <sup>17</sup>	5	2	6	P	3	6	3	2			Y	1		6	3	3		
Has a list of major potential and actual threats to the environment, detailing threatened species, ecosystems and landscapes been developed (prior to proposed schemes, so that these can be considered in context)?	P	P	D	P	D	P	P	P	5	Y				Y	P					Rev	

Commitment (The government of the Overseas Territory will:)																					
Measures																					
Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey (& Sark) <sup>1</sup>	Alderney	Sark <sup>1</sup>	
5. Commit to open and consultative decision-making on developments and plans which may affect the environment; ensure that environmental impact assessments include consultation with stakeholders.  EIAs publicly available to community and peer review with time for comment before decision.  Public enquiry system and decision independent of parties and government available and used  Decision process open with reasons given.  Policy development open to public consultation	Occasionally	N	D <sup>14</sup>	P	N	N	N	P	Y	Y		N	Rev	Y	?	?	Y	P	?		
	Mosley	N	N	N	Y	N	N	N	Y	N		N	Rev	N	?	?	Y	Y	Y		
	Mosley	N	D <sup>14</sup>	N	N	Y	Y	Y	Y	N		N	Rev	N	?	?	Y	P	Y		
	Y	N	D	Y	Y	N	Y	Y	Y	Y		N	Rev	Y	?	?	Y	P	P		
6. Implement effectively Multilateral Environmental Agreements already extended to the Territory and work towards the extension of other relevant agreements.	Ramsar Convention on Wetland extended to Territory	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	Number of sites designated as Wetlands of International Importance	7	1	1	1	0	0	0	0	2	0	1	0	0	0	1	1	4	1	1	1
	Area (km <sup>2</sup> ) designated as Wetlands of International Importance	0.36	0.82	586	10.7	0	0	0	0	47.5	0	0	354	0	0	21.7	1.93	187	3.9	156.3	0.01
	Area (km <sup>2</sup> ) of sites identified as qualifying as Wetlands of International Importance but not yet designated	90	97	82	300	50+	50	179	1315	4033	-	ca 40000	63	?	0	34.4	12.8	6.9	?	0	
	Area (km <sup>2</sup> ) designated as Wetlands of International Importance but suffering damage	5	21						0												
	Area (km <sup>2</sup> ) of wetland outside protected areas being managed sustainably	0																			
	Area (km <sup>2</sup> ) of wetland outside protected areas for which there is no information on management	All																			
	Area (km <sup>2</sup> ) of wetland outside protected areas which has suffered damage	much	1+	1+	1+				?												
	CITES extended to Territory	Y	Y	N	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y
	Convention on Biological Diversity extended to Territory	N	Y	N	Y	N	Y	Y	Y	N	N	N	N	N	Y	N	N	Y	N	N	N
	Convention on Migratory Species extended to Territory	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Agreements under CMS extended to Territory:																				
	Conservation of Albatrosses & Petrels (ACAP)	N	N	N	N	N	N	N	Y	Y	Y	Y	N	N	N	N	Y	N	N	N	N
	Conservation of Cetaceans in the Black Sea, Mediterranean and Contiguous Atlantic Area (ACCOBAMS)	-	-	-	-	-	-	-	-	-	-	-	-	-	N	N	-	-	-	-	-
	Small Cetaceans of the Baltic and North Sea (ASCOBANS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	As soon as possible	N	N	N	N



Commitment (The government of the Overseas Territory will:)	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey (& Sark) <sup>1</sup>	Alderney	Sark <sup>1</sup>
Measures																				
Conservation of Migratory Species of Wild Animals (Eurobats)	-	-	-	-	-	-	-	-	-	-	-	-	-	Y	N	nded	N	N	N	N
Conservation of Migratory Species of Wild Animals - Indian Ocean Turtle MOU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
World Heritage Convention extended to Territory	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N
Number of World Heritage sites (natural and cultural) designated	1	0	0	0	0 <sup>18</sup>	0	0	0	1	0	0	0	1	?	0	0	0	0	0	0
Area (km <sup>2</sup> ) of World Heritage sites (natural and cultural) designated	?	0	0	0	0	0	0	0	79	0	0	0	37	?	0	0	0	0	0	0
Number of domestically protected cultural heritage sites			7		2					55 <sup>19</sup>		0								
Area (km <sup>2</sup> ) of domestically protected cultural heritage sites			2		?					?		0								
Other Conventions extended to Territory																				
Convention for the Protection of the Natural Resources and Environment of the South Pacific (SPREP) and Final Act of the High Level Conference on the Protection of the Natural Resources and Environment of the South Pacific Region (Noumea, New Caladonia, 17-25 November 1986)	-	-	-	-	-	-	-	-	-	-	-	-	N	-	-	Y	N	N	N	N
Convention for the Protection of the Marine Environment of the North-East Atlantic OSPAR	-	Y	Y	Y	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena)	-	N	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Protocol concerning specially Protected Areas and Wildlife (SPAW) to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (London Convention)																				
[Other indicators to be investigated, possibly related to the compliance reports that are sent to the Convention Conferences/Meetings of the Parties]																				
<b>7. Review the range, quality and availability of baseline data for natural resources and biodiversity.</b>																				
Taxa and natural resources for which base-line data have been collected and made available, with extents of coverage for each. <sup>20</sup>	Man y	Seve ral	Som e	Seve ral	Som e	Seve ral	Som e	Seve ral	?	?	?	?	Som e	Man y	?	Man y	?	?	Man y	Man y
Taxa and natural resources for which there are monitoring programmes, with extents of coverage for each. <sup>21</sup>	Man y	Seve ral	0	0	Som e	Som e	Som e	Seve ral	?	?	?	?	N	Man y	?	Man y	Man	?	Man y	Man y

[illegible]

Commitment (The government of the Overseas Territory will:)	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S. Georgia & S. Sandwich Is.	British Antarctic Territory	British Indian Ocean Territory	Pacific Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey (de Sark)	Alderney	Sark
Measures																					
Number of publications by NGOs in each year on local environmental topics																					
2002-3	2		4												1					1	
2003-4	2		3												1					1	
2004-5	2		3		2				1						1					1	
2005-6	1	1	10		0				2						3					1	
2006-7	1	1	8		1				1						5					2	
2007-8	0	1			2										1					3	
Programme in place to promote Environment Charter and implementation strategy																					
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.																					
[Measures largely included in the 10 above.]																					

#### Notes:

- Although having their own administrations, Alderney, Sark and Guernsey are part of the Bailiwick of Guernsey and some aspects are dealt with at Bailiwick level. The general information in the Guernsey column tends to relate also to Sark.
- Bermuda has two separate relevant processes, one for a Biodiversity Strategy and the other for a Sustainable Development strategy.
- Gibraltar's Environment Charter is of a different type to the others, and is not an agreement with HMG. The Environment Charter being considered by Alderney is based on the UKOT one, but would be a unilateral adoption by Alderney.
- Anguilla fund not yet ear-marked for the environment, but this is being explored.
- Anguilla does have a non-governmental Anguilla Community Fund from non-governmental sources.
- Anguilla lacks legislation to designate terrestrial protected areas, but such legislation has been drafted and awaits being put before the Legislative Assembly.
- St Helena awaits new legislation for protected areas and the 15 sites are proposed in the strategy, noted in planning matters but not yet designated.
- The Government of South Georgia & the South Sandwich Islands considers that the whole of South Georgia is effectively a protected area, but notes that a more specific review of areas and appropriate levels of protection is under review.
- Information on the extent of active management of protected areas is incomplete partly because of a missing section of the questionnaire.
- Change in protected areas in Bermuda estimated because of incomplete information received.
- Change in protected areas in Turks & Caicos Islands incomplete because TCI has been unable to supply figures.
- In the Falkland Islands, 18 islands cleared of rats.
- For Gibraltar, in practice rather than as formal policy.
- For these territories, ELAs are required, but there are problems in that developments may be effectively approved at an earlier stage and/or ELAs are inadequate.
- Not required, but undertaken in practice, although may be subject to similar problems to those noted at 14.
- Not required, but usual.
- Although TCI ELAs are publicly available, in practice they are difficult to access and not available in time to consult before decisions.
- Anguilla has put forward a proposal for a World Heritage Site, but HMG has not yet put this forward to the Convention.



19. 55 buildings in the Falkland Islands
20. Coverage reported for baseline data:
  - Bermuda: marine reptiles, birds, skinks, coral reefs, terrestrial & marine plants, marine molluscs, marine polychaetes, commercial fisheries, coastal erosion, freshwater, amphibians – island-wide
  - Cayman Islands: national: Red-list flora, queen conch, marine turtles, parrots (GC & CB), blue iguana (GC). GC: bats
  - Turks & Caicos: iguana, grouper, conch, lobster nationally. Biodiversity survey of North, Middle & East Caicos
  - British Virgin Islands: samples: in-shore; seabirds, all near-shore; Rock iguana, Aneгада; Forest, Aneгада & Gorda Peak
  - Anguilla: reptiles (Only snakes, iguana and Ameiva species, some work also done on geckos and anoles); invertebrates (Only some beetle work, spider work and butterflies, moths, wasps); coastal resources (Reefs, sea grass beds, coastal mangroves; however marine commercial reef fish data is still lacking.)
  - Montserrat: forest birds, bats, herptiles, plants, fisheries and catch effort, agricultural production
  - Ascension Island: endemic plants, seabirds, green turtles
  - St Helena: seabirds, cetaceans, invertebrates on Prosperous Bay Plain, lower plants there & NE, marine fish
  - Pitcairn: plants, all; various, Henderson
  - Gibraltar: herptiles, mammals, birds, higher plants complete; terrestrial & marine invertebrates & marine vertebrates
  - Isle of Man: birds, land-use, main rivers all island, ponds half; plants on all protected sites & invertebrates on some
  - Alderney: Breeding birds island-wide; storm petrels and puffins on Isle of Burhou; gannets at 2 breeding colonies; seaweeds in Clonque Bay; butterflies and moths at sample sites
  - Bermuda: coral reefs & sea-grass; turtles, cahow, longtail, bluebird, skinks, ground water, commercial fisheries, water quality on marine platform – island-wide
  - Cayman Islands: As in note 20
  - Anguilla: Birds of wetlands and sea
  - Montserrat: Impact of rats on fauna and flora at test sites
  - Ascension Island: green turtles, seabirds, endemic plants
  - St Helena: seabirds, cetaceans, grouper, fish catch, vegetation, wirebirds, fish
  - Gibraltar: herptiles, mammals, birds, higher plants, terrestrial invert
  - Isle of Man: birds, river water quality
  - Jersey: all 50 Biodiversity Action Plan species
  - Alderney: as for survey in note 20, with breeding success as well as numbers for some birds
21. Topics which are priorities for further information gathering:
  - Bermuda: All endemic & native species, coastal erosion, sea-level rise, ground water quality, coral reef & seagrass, cave habitat, IAS
  - Cayman Islands: Update habitat map since Hurricane Ivan; insects & fungi are very data-deficient
  - Turks & Caicos: Turks Head cactus
  - British Virgin Islands: Fish, beach profile monitoring, nesting seabirds; insects; herptiles; flora
  - Anguilla: Vegetation mapping; invertebrates
  - Montserrat: Mountain chicken (frog), galliwasp (lizard), endemic plant species, invasive species, restricted range bird species, turtles, terrestrial and marine habitats
  - Ascension Island: Fish
  - St Helena: Marine plants & invertebrates
  - Pitcairn Islands: Invasives, Endemics
  - Gibraltar: Marine, terrestrial invertebrates, bryophyte, fungi
  - Alderney: marine bird survey; marine diversity survey
22. One case of decline due to volcanic ash.
- 23.

# Measures of performance of UK Government in implementing its Commitments in the Environment Charters (or equivalent environmental progress for territories without charters)

As noted in the introduction, this section of the collation is much less complete than the first part, because UKOTCF has not received information from HMG in respect of the UK Commitments in the Environment Charters. UKOTCF hopes that HMG will identify the resources to report on its Commitments in the future, and UKOTCF remains ready to collate any such information with the material received from elsewhere.

Please note that, whilst UK Government shares responsibility for international environmental commitments with territorial governments in all UK Overseas Territories and Crown Dependencies, it is not party to an Environment Charter with the British Antarctic Territory, the Cyprus Sovereign Base Areas (which are both directly governed by UK Government Departments), Gibraltar or the Crown Dependencies (Isle of Man, Jersey, Guernsey, Alderney & Sark).

Commitment (The government of the UK will:)	General	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey	Alderney	Sark
Measures																						
	1. Help build capacity to support and implement integrated environmental management which is consistent with the Territory's own plans for sustainable development.																					
Number of capacity building projects resourced by HMG in each UKOT.																Not want ed				0		
2002-3			1		0		1		0		0					Y						
2003-4					2		0		0		1											
2004-5			1		1		1		0		1											
2005-6			4		0		2		0		0											
2006-7									0													
Help provided to develop strategy for action		Y	B	Y	Y		N		Y	Y	Y		N			Y			N	N	N	N
Help provided to implement strategy for action process		N	N	N	N		N		Y		N					n/a			N	N	N	N
			(in prep )													n/a						
HMG has indicated named officer or body for monitoring and reporting on the development and implementation of Environment Charters in general and in each Territory			?		?		N				Y		n/a		N	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Has HMG included in the Governor's letter of appointment any specific responsibility in respect of the Environment Charter?			?		?		?		?		N		n/a			n/a	n/a	n/a	n/a	n/a	n/a	n/a
Is there any reference to reporting on and progressing the Environment Charters in the standing agenda items for the annual Overseas Territories Consultative Council?	No												n/a			n/a	n/a	n/a	n/a	n/a	n/a	n/a
When did the Inter-Departmental Ministerial Group most recently consider Environment Charters and their progress?	Never																					

Commitment (The government of the UK will:)	General	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey	Alderney	Sark
Measures																						
2. Assist the Territories in initiating, reviewing and updating environmental legislation.																						
Help provided by HMG to review environmental legislation																						
Help provided by NGOs to review environmental legislation																						
Number of new/revised Ordinances support provided for drafting																						
3. Facilitate the extension of the UK's ratification of Multilateral Environmental Agreements of benefit to each of the Territories and which each Territory has the capacity to implement (and a desire to adopt.)																						
Number of additional MEAs support provided to join.																						
Number of projects supported to help implementation.																						
2002-3																						
2003-4																						
2004-5																						
2005-6																						
2006-7																						
Number of requests made by Territory which HMG was unable to meet																						
2002-3																						
2003-4																						
2004-5																						
2005-6																						
2006-7																						
4. Keep the Territories informed regarding new developments in relevant Multilateral Environmental Agreements and invite the Territories to participate where appropriate in the UK's delegation to international environmental negotiations and conferences.																						
Number of information items provided on MEAs each year.																						
2002-3																						
2003-4																						
2004-5																						
2005-6																						
2006-7																						
Number of participants from UKOTs and UKOT-centred bodies in UK delegations to CoPs etc																						
2002-3																						
2003-4																						
2004-5																						
2005-6																						
2006-7																						



Commitment (The government of the UK will:)	General	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey	Alderney	Sark
Measures																						
Number of UKOT government/NGO personnel supported in attending MEA meetings					2		0		1		0							0		0		
2002-3							0				0											
2003-4							0				0											
2004-5							0				0											
2005-6							0				0											
2006-7																						
5. Help each Territory to ensure it has the legislation, institutional capacity (technology, equipment, procedures) and mechanisms it needs to meet international obligations.																						
Technical help resourced by HMG for UKOTs to implement international commitments					1		0		0		0							0				
2002-3					1		0		0		0											
2003-4					0		1		0		0											
2004-5					3		0		0		0											
2005-6					1		0		0		0									1		
2006-7			1						0		0				Y			0				
Equipment resourced by HMG for UKOTs to implement international commitments							0		0		0				Y			0				
2002-3							0		0		0											
2003-4							0		0		0											
2004-5				1			0		0		0											
2005-6				1			0		0		0											
2006-7																						
6. Promote better cooperation and the sharing of experience between and among the Overseas Territories and with other states and communities which face similar environmental problems.																						
Number of conferences supported					1		1		1		0											
2002-3					1		1		1		0											
2003-4							0		0		0											
2004-5							0		0		0											
2005-6							0		0		0											
2006-7			1		1		2		1		1								1			
Number of UKOT conference participants supported					2		2		2		2								0			
2002-3					2		2		2		2											
2003-4							0		0		0											
2004-5							0		0		0											
2005-6							0		0		0											
2006-7			3		2		4		1		1				1							

Commitment (The government of the UK will:)	General	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey	Alderney	Sark
Measures																						
Number of visits/exchanges between UKOTs and with UK or regional partners supported																						
2002-3							0		0		0								0			
2003-4							0		0		0											
2004-5							0		0		0											
2005-6							0		0		0											
2006-7																						
Support provided for establishment and use of websites/ databases																						
2002-3									0		0											
2003-4									0		0											
2004-5									0		0											
2005-6									1		0											
2006-7			1					1	1		0											
2006-7																						
7. Use the UK, regional and local expertise to give advice and improve knowledge of technical and scientific issues. This includes regular consultation with interested nongovernmental organisations and networks.																						
Number of cases of expert visits from UK supported																						
2002-3									+		0									0		
2003-4									0		0											
2004-5					1				0		1								1			
2005-6					1		4		1		0											
2006-7			1				4															
2007-8							5															
Number of cases of visits from UKOTs to UK experts supported																						
2002-3											0											
2003-4											0											
2004-5											0											
2005-6											0											
2006-7											0											
Number of other cases of advice supported									++											?		
2002-3											0											
2003-4											0											
2004-5											0											
2005-6											1											
2006-7																						
Number of liaison meetings between HMG and NGOs and coordinating bodies																						
2002-3	2																					
2003-4	2																					
2004-5	2																					

Commitment (The government of the UK will:)	General	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey	Alderney	Sark
Measures																						
2005-6	2										4											
2006-7	2																					
8. Use the existing Environment Fund for the Overseas Territories, and promote access to other sources of public funding, for projects of lasting benefit to the Territory's environment.																						
Number of projects approved for support each year by EFOT or its successors (OTEP)																						
2002-3	3	1	2	1	1	2	1	2	3	2	2	1	0	2	1	1	0					
2003-4																						
2004-5	2	3	0	0	1	2	2	1	2	2	2	1	0	2	1	0	0					
2005-6	0	2	1	2	0	0	2	1	1	2	0	1	0	1	0	0	0					
2006-7	6	2	2 (1 deferred)	0	0	3	3	0	1	2	2	0	0	1	1	0	0					
Value of projects supported each year by EFOT or its successors (OTEP)																						
2002-3																						
Committed by OTEP in 2003-4 & 2004-5 (£k) [This line is included as information from HMG, pending accurate data for individual years.]	461	146	33	113	180	260	103	169	181	206	260	120	0	121	21	41	0					
2003-4 (£k)			12		0		0		22													
2004-5 (£k)					85		22	61	206													
2005-6 (£k)			50		40			68	45		0											
2006-7 (£k)			54																			
Spend by Defra or its functional successors on UKOT environmental issues								0												0		
2002-3									0					0								
2003-4					160				0		0		0	0								
2004-5									0		0		0	0								
2005-6			35				161		0		115		0	0								
2006-7			67																			
Spend by DCMS or its functional successors on UKOT issues			0		0		0	0												0		
2002-3									0		0		0	0								
2003-4									0		0		0	0								
2004-5									0		0		0	0								
2005-6									0		0		0	0								
2006-7									0		0		0	0								



Commitment (The government of the UK will:)	General	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey	Alderney	Sark
Measures																						
Spend per year by HMG on UKOT/CD environmental issues	£1m in total																			0		
2002-3			0		15		130				?											
2003-4		12	12	160	0		0				?											
2004-5		35	85	85	22		61				?											
2005-6		127	40		161		115															
2006-7		121			?																	
Spend per year by HMG on GB/NI environmental issues	£460 m																					
2002-3																						
2003-4																						
2004-5																						
2005-6																						
2006-7																						
Number of HMG funds accessed by UKOTs		2	2				3	1	1		2									0		
[additional measures relating spend to importance/need/threat under review]																						
9. Help each of the Territories identify further funding partners for environmental projects, such as donors, the private sector or nongovernmental organisations.																						
Number of other funders for each UKOT identified by HMG			0		0		0	1			0			0						0		
Value of funding secured from these sources per year by HMG on UKOT environmental issues		0			0		0								0					0		
2002-3									0		0				0							
2003-4								9	0		0				0							
2004-5								9	0		0				0							
2005-6								11	0		0				0							
2006-7																						
Funding for the built environment supplied per year by HMG on UKOT environmental issues		0			0		0		0		0									0		
2002-3									0		0											
2003-4									0		0											
2004-5									0		0											
2005-6									0		0											
2006-7															1							

Commitment (The government of the UK will:) Measures	General	Bermuda	Cayman Islands	Turks & Caicos Islands	British Virgin Islands	Anguilla	Montserrat	Ascension Island	St Helena	Tristan da Cunha	Falkland Islands	S Georgia & S Sandwich Is	British Antarctic Territory	British Indian Ocean Territory	Pitcairn Islands	Gibraltar	Cyprus Sovereign Base Areas	Isle of Man	Jersey	Guernsey	Alderney	Sark
<p>10. Recognise the diversity of the challenges facing the Overseas Territories in very different socio-economic and geographical situations.</p> <p>Recognition by key Departments within HMGO e.g DFID, Defra that the UKOTs are very different in terms of their socio- economic and geographical situations:</p> <p>Ensuring access to email and www communication systems for government &amp; NGOs in each UKOT/CD</p> <p>Ensuring establishment and functioning of environmental NGO in each UKOT/CD.</p> <p>[Other measures may be developed]</p>					Y			N	Y		N			n/a	Y							
			N		Y		P	I	Y		N			Y								
<p>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.</p> <p>[Measures largely included in the 10 above.]</p>																						

# Turks & Caicos Islands and the implementation of the model Environment Charter strategy

**Michelle Fulford-Gardiner, Deputy Director, Department of Environment & Coastal Resources, Turks & Caicos Islands**



Fulford-Gardiner, M. 2007. Turks & Caicos Islands and the implementation of the model Environment Charter strategy. p 73 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The Environment Charters, agreements signed in September 2001, between HMG and the Governments of the United Kingdom Overseas Territories (UKOTs), set out a range of overarching principles and commitments for both governments to uphold. They act as a medium by which biodiversity conservation and sustainable development could be incorporated into all sectors of the territories.

The Turks & Caicos Islands (TCI) made history at the end of 2003 with the completion of the first action strategy for the implementation of the Environment Charter, setting the pace for other UKOTs to follow. Such a milestone was achieved by employing the expertise of the United Kingdom Overseas Territories Conservation Forum (UKOTCF), as facilitators. Out of this exercise, the process has been documented and published on the UKOTCF website as a guidance document for other UKOTs to model in the advancement of their Charters.

Since completion of the action strategy, very little progress has been made towards its implementation phase in TCI. This is primarily due to lack of capacity, both financial and human resources, to support effective implementation. While there have been numerous conservation projects in the TCI funded by Overseas Territories Environment Programme (OTEP) and other sources, most of these have been presented independent of the strategy's priority actions. The Forum has developed a checklist system to inform progress. However, what is warranted is the establishment of an effective local body that would act as a focal point of coordination of the Environment Charter and other sustainable development activity within in the TCI. The advancement of such a body should take precedence, and be incorporated in the country's overall strategy for economic development, as the environment and the services it provides lie at the root of TCI's economy.

Notably, the Environment Charter in the UKOTs is being used as a key indicator in monitoring and reporting of progress towards CBD 2010 target in reduction of biodiversity loss.

This paper will set out a roadmap by which the TCI can effectively take forward the implementation of the Environment Charter action strategy, and hopefully provide further guidance to the other UKOTs

**Michelle Fulford-Gardiner**, Deputy Director, Department of Environment & Coastal Resources, Turks & Caicos Islands [michellegar@gmail.com](mailto:michellegar@gmail.com)



# St Helena and the application of the pilot model for strategy development

**Cathy Hopkins, Director, St Helena National Trust; and formerly Chair of St Helena Environment Advisory Consultative Forum**



Hopkins, M.C. 2007. St Helena and the application of the pilot model for strategy development. pp 74-76 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://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 presentation reviews the experience of St Helena in being the first territory to apply the pilot model method developed by the UK Overseas Territories Conservation Forum and the Turks & Caicos Islands.

**Cathy Hopkins**, Director, St Helena National Trust, Broadway House, Main Street, Jamestown STHL 1ZZ, St Helena. [sth.natrtrust@helanta.sh](mailto:sth.natrtrust@helanta.sh)

## Background to project

No one St Helena Government (SHG) department has overall responsibility for the environment. It lies within various departments and the St Helena National Trust (SHNT), which embraces the St Helena Nature Conservation Group, the Heritage Society and other NGOs.

Taking forward the Environment Charter falls to the Environmental Co-ordinator within the Environmental Planning Department (EPD). A first step was the establishment of an Environmental Advisory Consultative Forum (EACF) in 2003. Membership included:

- Environment & Conservation Sections from within SHG departments,
- SHNT,
- Legislative Council,
- Private sector, and
- the Governor's office.

This fulfilled the first commitment under the Charter. Other Charter Commitments were being broadly fulfilled but there was no overall Action Plan. We recognised the need for a Strategy for the Implementation of the Charter commitments

Aware of the TCI pilot model, St Helena approached Mike Pienkowski for advice and assistance with developing the Strategy. A project proposal was drawn up with help from Mike and approved for OTEP funding. The project started in April 2004.

The TCI model was adapted for St Helena with very few modifications. The TCI approach of taking each Charter commitment and breaking it into its elements was used. This gave a huge matrix which identified actions/programmes with an as-



*Endemic scrubwood in flower & view of south coast of St Helena*

**Commitment 2: Ensure the protection and restoration of key habitats, species and landscape features through legislation and appropriate management structures and mechanisms, including a protected areas policy, and attempt the control and eradication of invasive species.**

*Desired Outcome: Key habitats, key species and landscape features are protected, and/or restored.*

Elements of Commitment	Existing programmes/projects/activities	Potential actions/programmes which would address gaps/issues identified in Workshop 1
2.a. Have in place effective legislation for protection of key habitats, species and landscape features	<p>National Parks Ordinance 2003 (provide powers to permit the establishment of parks, nature reserves, sanctuaries and area of historical interest, and generally for the conservation of the natural and ecology of St. Helena)</p> <p>Draft list of protected areas prepared</p> <p>Endangered Species Protection Ordinance 2003 (regulates trade in endangered species to give effect to the <b>Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)</b>, and also gives the Governor in Council the authority to make Orders to protect and encourage the continued existence of any species of plant or animal endemic or indigenous to St. Helena)</p> <p>St Helena National Trust Ordinance 2001 (to establish a National Trust: to act as custodian of St. Helena's heritage, to preserve and promote the island's natural environment and its archaeological, historical and cultural resources for present and future generations)</p> <p>Some relevant provisions also in Land Planning and Development Ordinance 1998, and Fishing Ordinances (see Commitment 3 below)</p>	<p>(To fulfil Article 8 of the <b>Convention on Biological Diversity</b>):</p> <p>(k) Develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations;</p> <p>Draft and pass Regulations needed under National Parks Ordinance to implement protected areas.</p> <p><i>National Parks Ordinance amendments?</i></p> <p>Extend the marine protected area to include all the coastline and inshore waters, with zoning of different levels of protection, using the existing categories of protected area, under the legislation.</p> <p><i>Zoning of different levels of protection and delete ..</i></p> <p>Consider giving protected area status to all the land previously known as 'crown wastes', because of its importance to endemic species?</p> <p>Analyse the results of the tree questionnaire to clarify public opinion. In the light of this, look at existing legislation and, if required, propose new policy for management of trees of historical and cultural importance (possibly including tree preservation orders).</p> <p>Review whether the legislation for protected areas (on land and sea) gives all the powers needed for effective management, monitoring and enforcement.</p> <p>Consider legislation regulating boats for watching dolphins and whales, including numbers of boat-visits per unit time and how close to approach.</p>

*A sample page from the matrix*

sociated lead body(ies) for each.

The initial documenting task seemed rather daunting, with several hundred actions. However, as we worked the tables, we could see how many actions were already in progress/completed. The matrix became the basis for the whole process and this approach was undoubtedly key to the successful development of the Strategy.

## The Workshops and beyond

The method used a participatory workshop approach. We found the role of the facilitators invaluable. This generated a positive response from stakeholders, as well as recognition of the role played by EACF in bringing all stakeholders into one forum where St Helena lacks a "Ministry for the Environment".

There is an ongoing difficulty of resourcing the EACF, and we appreciate the work of the Environmental Co-ordinator and her small team within EPD.

The Strategy document contained 5 columns including "Actions already completed" and "Actions in Progress" - a development from the TCI model.

The Strategy development exercise was hugely useful to St Helena. This included: a realisation of how much was actually going on in the various departments as well as in the NGOs; a sharing of knowledge; and a new depth of understanding & appreciation of each other's work.

St Helena's Strategy for Action was endorsed by Executive Council in July 2006. This shows that we have SHG support. However, it does not necessarily mean that we have political clout for taking forward environmental issues. EACF provides a focus for taking forward the Charter – we have the Strategy and must ensure that the planned actions are taken. The Environmental Co-ordinator is currently undertaking a review of progress.

A full costing of the actions was not possible as not all stakeholders completed Document S (see illustration below) for each project or work-area, in spite of assistance being offered by Environmental Co-ordinator. We would recommend that should any other UKOT undertake a similar approach the format of these prototype forms which we were testing should perhaps be re-designed as a simple questionnaire showing resource implications.

The current review is proving very time consuming

## Environment Charter Strategy for Action – Implementation Activities

Note that not all boxes will apply to every activity. Please expand each box as necessary.

<b>Cross-reference to strategy document (if applicable)</b>	
Environment Charter commitment this addresses	
Lead implementing organisation	
Contact person	
Other main orgs involved	
Objective	
Outputs	
Intended outcomes	
Project activities	
Exit strategy/sustainability (where appropriate)	
Project status (new, current, etc)	
For current project: Dates of project/activity	
For current project: Budget head and/or external funding body	
For proposed projects: --Proposed budget --Likely funding source	
Any other relevant information	
<b>Title of project/activity/task</b>	
Project summary	
Date this form completed and by whom	

Please e-mail completed form to [pienkowski@cix.co.uk](mailto:pienkowski@cix.co.uk) and [Isabel@sainthelena.gov.sh](mailto:Isabel@sainthelena.gov.sh)

*Blank Form S*

for Environmental Co-ordinator using a process agreed by EACF. The Environmental Co-ordinator is visiting each department/section/NGO/individual to interview them about their respective actions, problems, future plans and constraints. The findings will be presented to EACF and then to Executive Council. It will provide the basis for the Action Plan for 2007-8.

### Advantages of using TCI model

We found several advantages of using the TCI model:

1. Resources on Island: it allowed the best use of our very limited human and financial resource to develop the strategy.
2. Method: The lead facilitator had already learned in developing the TCI pilot model and refined his approach for St Helena – we did not need to re-invent the wheel!
3. Time: Building on experience of the facilitators, the process of designing and agreeing the strategy documents took one year with two visits by consultants as opposed to 4 visits to TCI.
4. Audit: It proved good value to OTEP as the funding provider and to St Helena as the user.

Plans to develop air access and a recent approach to investigate our marine heritage have highlighted environmental concerns in St Helena and raised public awareness of the importance of conserving the environment for sustainable, eco- and heritage tourism.

St Helena values the outputs of the OTEP project and the Strategy to Implement the Environment Charter, and would like to thank TCI and UKOTCF, DFID and FCO for their support.



*Endemic wirebird on nest*



# The implementation of the Environment Charter in the Falkland Islands

**Dominique Giudicelli, Environmental Planning Officer, Falkland Islands Government**



Giudicelli, D. 2007. The implementation of the Environment Charter in the Falkland Islands. pp 77-81 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

This presentation is a summary of progress in implementing the Environment Charter in the Falkland Islands and developing a co-ordinating strategy.

**Dominique Giudicelli**, Environmental Planning Officer, Falkland Islands Government, Stanley, Falkland Islands FIQQ 1ZZ.  
[dgiudicelli.planning@taxation.gov.fk](mailto:dgiudicelli.planning@taxation.gov.fk)

The Environment Charter was signed in 2001. Since that time, much progress in its implementation has taken place in the islands.

A Conservation and Biodiversity Officer was appointed in 2003. This was funded in the main by the FCO through OTEP. The officer produced a draft Conservation and Biodiversity Strategy with two “sister” documents. These are a “baseline survey” for the island’s biodiversity and a report on “trends and pressures” which gives an idea of what changes are taking place affecting biodiversity. All documents were produced in 2005 and still need to be updated to a final version.

The Conservation Officer left in April 2005 as it was a 2-year project. This departure highlighted a great gap in “environmental” capacity within the government.

The government has consistently funded a large number of environmental/conservation projects in two ways: firstly by giving significant core grants to the main NGO, Falklands Conservation, and

its own “Environmental Budget” which is used to fund a number of conservation and environmental enhancement projects.

It has become clear that, in order to implement better the Environmental Charter – and, more specifically, to complete the Conservation and Biodiversity Strategy which is regarded as a critical document for the future of the island’s biodiversity – capacity is needed on a permanent basis, within the government. Consequently, part of the Environmental Budget has been used to appoint a permanent and full-time officer and appointment is taking place at present.

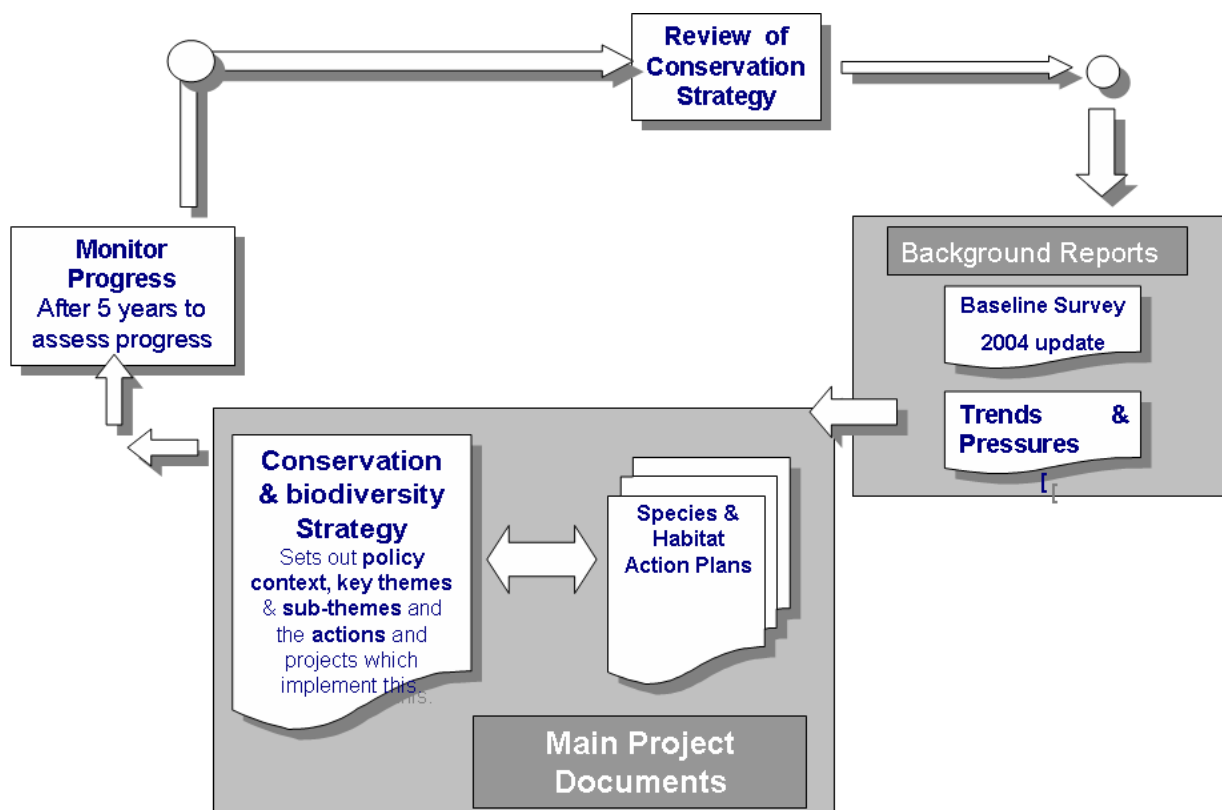
This is an exciting development, as it is the first permanent post created specifically to deal with conservation and the environment in the Falklands. It should help to involve the community in playing a stronger part in conserving the outstanding biodiversity of the islands. It will also help to meet the growing number of international obligations in a meaningful manner.

The Environment Charter (2001) sets out commitments which are a mix of strategic policy objectives and specific undertakings.

## **1 Bring stakeholders to formulate detailed Strategy.**

- A draft Conservation and Biodiversity Strategy (CBS) and 2 “sister” documents: Trends and Pressures and A Baseline Survey, are in place since 2005.
- CBS has had some stakeholder involvement (priority setting workshop, 2005).



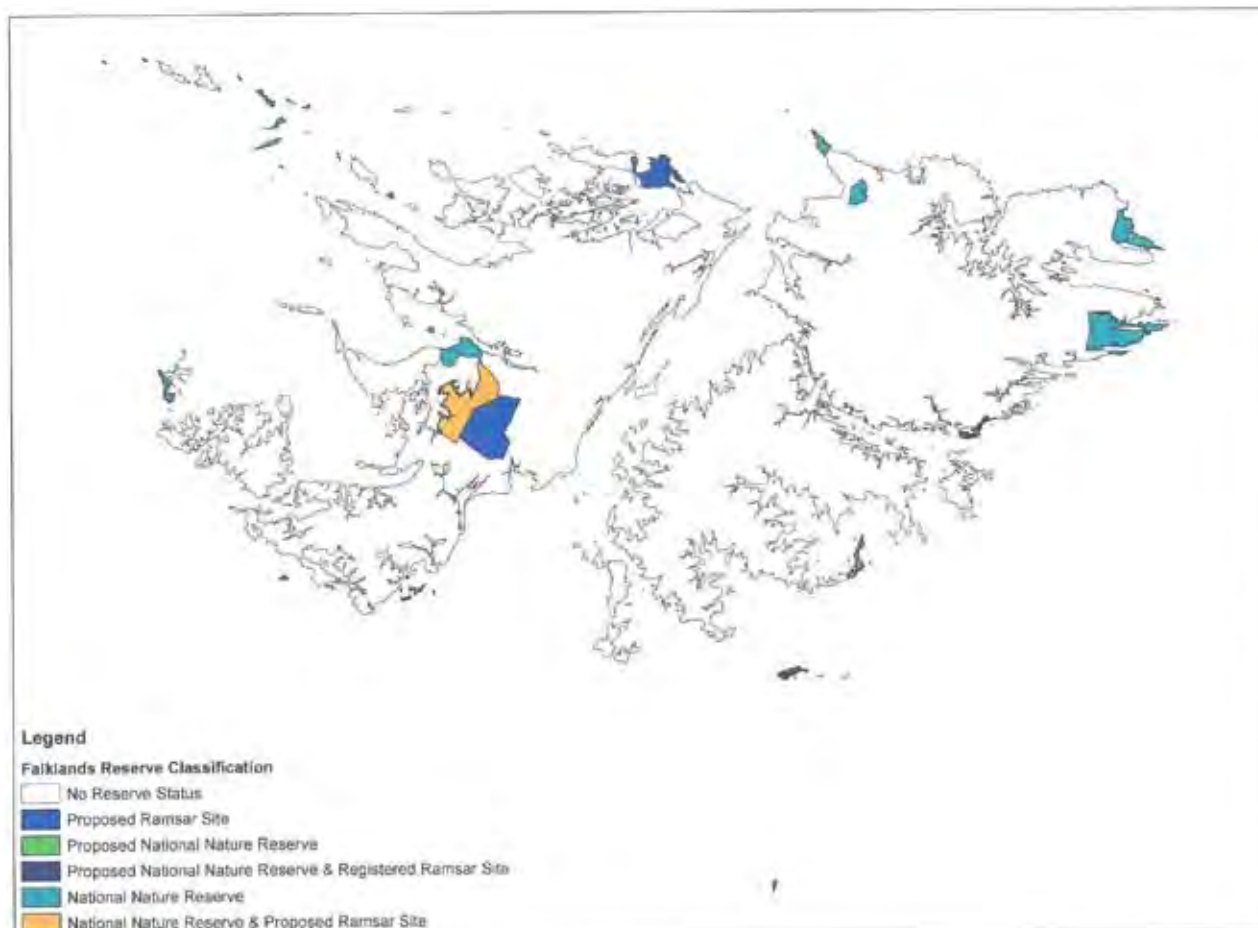


## 2 Protection and restoration of key habitats.

- Identified in draft CBS as a priority – CBS pro-

motes whole ecosystem approach which fits in well with habitat management.

- Falkland Islands Structure Plan and Stanley Town Plan – 2004. For future sustainable development... contains policies promoting habitat



## LHB7 Protection of Species

The Government will not normally grant consent for developments on land or water that would have a significant adverse effect upon species protected by law and their habitat. In cases where planning approval may be acceptable conditions may be imposed or planning agreements sought, which:

- i) ensure the survival of individual members of the species; and/or
- ii) reduce the disturbance to members of the species to an acceptable minimum.

### Issue and Objective

In considering development proposals it is essential that the possible effects on species and their habitat are adequately addressed. This is particularly relevant where species are protected by law. The objective will be to ensure that the

most important species are protected from unsustainable development.



King and Magellanic penguins, Volunteer Beach

### Methods and Outcomes:

Important species and habitats protected by the Conservation of Wildlife and Nature Ordinance are listed in schedule 4. The Government will also seek to ensure that its consideration of proposals for development or land use change

reflects its obligations under the UK Overseas Territories Environmental Charter and any Bio-diversity Action Plan in place at the time. Proposals raising specific environmental concerns relating to habitats or species of recognised importance will be required to be accompanied by an environmental impact statement. The retention or enhancement of key habitats such as tussock will be encouraged.



Tussock habitat

*Example from Falkland Islands Structure Plan*



management.

- Land is mostly in private ownership which can be challenging for habitat management
- National Nature Reserve (NNR) legislation is weak – however, some Management Plans are being drafted, including habitat-specific objectives and resources.
- Grants to NGOs for rat clearance and study of invasive species (£ 20K in 2005/06)
- Biosecurity Strategy: (Dec 2004). Some recommendations deal with the control of Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, page 79

invasive species and their risk to wildlife.

## 3 Environmental considerations integrated within socio-economic planning

- All Executive Council reports have a checklist which includes consideration of environmental considerations.
- Structure and Town Plans promote sustainable development and are considered in all new development proposals

### Biosecurity Strategy (dec 2004)

There is potential for exotic organisms to enter the Falkland Islands through a wide range of pathways and for damage to be caused to agriculture, native species or fisheries. The likelihood of damaging organisms entering and establishing in the Falkland Islands in any one year is small. The impacts, however, can be very large.

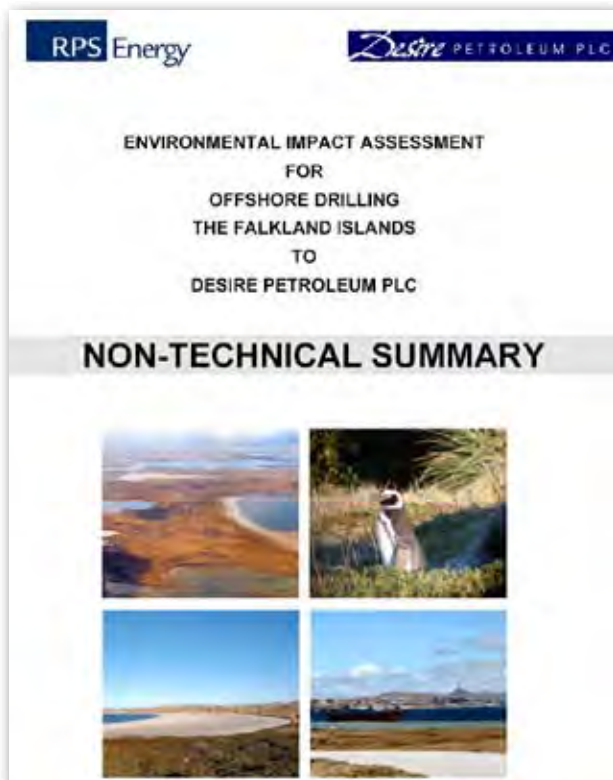
**Proposal 1.** That a specific information pack on biosecurity concerns in the Falkland Islands and the management of those risks associated with yachts be developed and supplied to all visiting yachts at their first port of call. This pack should include information on the risks of pet escapes, hull fouling, unapproved foods use, GASH disposal and visits to sensitive wildlife sites.

**Proposal 2.** That FIG work with cruise ship operators and local tour operators to ensure that, where appropriate, there is compliance with IAATO guidelines and that for visitors to Port William there is a biosecurity advisory programme.

**Proposal 3.** That passengers from cruise ships be prohibited from bringing food for consumption ashore.

**Proposal 4.** That information networks such as those available to Falkland Conservation and the Agriculture Department on international disease trends in birds and wildlife are used to target higher risk ships or visitors based on previous ports visited.





#### 4 Environmental Impact Assessment

- Environmental Impact Assessment (EIA) regulations as part of Planning Ordinance (2005) based on European Directive
- EIA regulations within the Offshore Minerals Ordinance (1994)

#### 5 Consultative decision-making

- The Environmental Committee is important in that it makes key environmental recommendations to FIG.
- Stakeholders participate in discussions and decisions (see picture below)
- Open to the public which is a key aspect of democratic decision making in the islands.



Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, page 80

#### 6 Implement Multilateral Agreements

##### Implemented

- Convention for the International Trade in Endangered Species (CITES)
- Agreement for the Conservation of Albatross and Petrels (ACAP)(2004)
- Kyoto Protocol (2006)
- The London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972
- The Ramsar Convention

##### Not implemented yet:

- The Aarhus Convention on Access to Information and Environmental Justice.
- The Convention on Biodiversity (CBD)
- The Cartagena Protocol (under the auspices of the CBD)
- The Rotterdam Convention on Prior Informed Consent (PIC)
- The Stockholm Convention on Persistent Organic Pollutants (POPs)

#### 7 Review quality of baseline data for natural resources and biodiversity

- Baseline Survey (2005) intended as a “live” document to be updated regularly
- Most other documents subject to reviews (e.g. Structure and Town Plans)

#### 8 Polluter pays legislation and policies

- Fortunate not to have much pollution
- Legislation not comprehensive (e.g. no equivalent to UK’s Environmental Protection Act 1990).
- Any new development can be controlled (and enforced) through Planning Ordinance by means of conditions
  - Structure and Town Plans contain Policies which aim to allow development which does not allow unacceptable environmental impacts

#### 9 Encourage teaching within schools to promote local environment and “act global”

- One NGO has much involvement with children

by means of its “watch group”. OTEP funded 18 month placement of Primary School teacher in Falkland and Ascension islands.

- Many teachers use local environment as example in classrooms.

### **10 Promote publications for islands biodiversity to increase awareness**

- All new publications are subject to public consultation. Use of radio and local press is extensive.



### **11 Abide by principles in Rio Declaration.**

- Improvement is taking place in many parts of principles. Current new appointment of full time “environmental officer” will accelerate implementation of charter.

### **Future directions:**

- Completion of Conservation & Biodiversity Strategy and sister documents
- Implementation of actions (and parallel allocation of resources)
- target “camp” [i.e. areas outside the capital, Stanley] to support diversification initiatives which enhance biodiversity e.g.: “set aside”(habitat restoration), visitor management schemes.



# Collaborating with the Organisation of Eastern Caribbean States Model towards Environment Charter Implementation: Anguilla's Approach

**Karim Hodge, Anguilla Director of Environment**



Hodge, K. 2007. Collaborating with the Organisation of Eastern Caribbean States Model towards Environment Charter Implementation: Anguilla's Approach. pp 82-85 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The Caribbean Overseas Territories that are members of the Organisation of Eastern Caribbean States (OECS) have signed the St George's Declaration of Principles for Environmental Sustainability in the OECS, and therefore must implement the instruments of the Declaration as well as those of the UK 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. This presentation summarises Anguilla's approach and progress in this regard.

**Karim Hodge**, Director of Environment, Government of Anguilla, P O Box 60, Parliament Drive, The Valley, Anguilla. [karim.hodge@gov.ai](mailto:karim.hodge@gov.ai)

In recent years, the Government of Anguilla has increasingly recognised the strategic advantage of environmental management and conservation. In response to changing pressures from stakeholders such as the electorate, environmental groups, local communities, and the island's administering power, Anguilla and Anguillians have realized that they need to analyse strategically their developmental context, and integrate ecological principles into their comprehensive national development strategies. In deciding on an environmental strategy, the country engaged in a process of analysis that focused on the internal factors, such as the resources, infrastructures, and the dependence on the fragile tourism sector.

Despite the advancement in knowledge and practices in the area of strategic environmental management and conservation, Anguilla was struggling to find the right mix and fit for an environmental strategy that will allow it to meet its regional and international obligations, as well as its commitment to sustainable national development. As had been found in other islands in the region during the early to mid 1990s, there was a potentially caustic gap that existed between what strategies were in

place and what was really needed to achieve the desired results.

Governments in the Organisation of Eastern Caribbean States (OECS) recognised that the absence of a sub-regional corridor towards environmental protection and management was an inevitable time-bomb waiting to explode. OECS, of which Anguilla is an associate member, at the 3rd Meeting of the OECS Environment Policy Committee in September 1999, requested that the OECS Secretariat prepare an "OECS Charter for Environmental Management" and "a regional strategy...that will become the framework for environmental management" in the region. While the gestation period lasted two years, to their credit, the OECS Ministers of Environment signed the St George's Declaration of Principles for Environmental Sustainability in the OECS (SGD), at St George's, Grenada in April 2001. Last month (September 2006), the SGD was revised by the OECS Member States to ensure that the key biodiversity conventions and other international and regional declarations, as well as international strategies and plans of actions, are now incorporated in the revised SGD. Drawing from the examples of the devel-



oped world and the international community, where MEAs are signed and the reporting and enforcement are left to the prerogative of the member country, the OECS called upon member countries to develop a National Environmental Management Strategies (NEMS). The NEMS remains the key mechanism for implementing the SGD at the national level. These strategies also offer Member States the opportunity to set and pursue national goals and targets in addition to, or at a more rapid pace than, those included in the SGD. Additionally, the NEMS provide an instrument for tracking progress towards the goals and targets of the SGD and for communicating with other Member States, national partners and regional institutions on that progress.

Moving from the regional context to a more national focus, we see that the preparation of a National Environmental Management Strategy and Action Plan (NEMS) for Anguilla is in fact a requirement of the Government in discharge of its obligations under the St George's Declaration (SGD) of Principles for Environmental Sustainability in the OECS, 2001. There are 21 Principles that have been prescribed in the SGD. Anguilla, like other OECS Member States, has agreed to utilise these in the governance of national affairs. Most of these Principles are directly relevant to the operations of the Ministries and statutory agencies in Anguilla.

The fundamental challenge for environmental conservation & management in Anguilla is to ensure levels of environmental quality that maximise opportunity for economic and social development for present and future generations, without compromising the integrity and sustainability of biological diversity, environmental and cultural assets. This challenge is accentuated by the vision of the present government's Manifesto. This suggests that the achievement of economic growth, international competitiveness and improved quality of life are largely dependent on the appreciation and management of the environment. Do not get me wrong: while the road ahead is a long and arduous one, it would be invidious of me if I

did not acknowledge that the implementation of the NEMS and the SGD have already begun to bear much fruit in Anguilla.

### **Examples of Implementation Successes based on the 21 Principles of the SGD:-**

#### **Principle 2 – Integrate Environmental Considerations into National Social & Economic Development Plans, Policies and Programmes**

Accomplishment – Government, by virtue of both policy and practice, has made EIAs a standard requirement for ALL tourism related developments and projects. This principle is also evident when one looks at the inclusion and active involvement of the Department of Environment and the Anguilla National Trust in all national discussions relating to economic and social development. Moreover, we have seen the Government of Anguilla begin to mandate to new tourism-related developers that portions of lands they acquire must be allocated to green space and/or protected areas.

#### **Principle 3 - Improve Legal & Institutional Frameworks**

Accomplishment – Through funding from OTEP, the Government of Anguilla has been able to commence, and are in fact almost ready to introduce, revised environmental ordinances in some cases, and introduce new legislation in other cases. Beneficiaries of this project have been the Anguilla National Trust, which now boasts a revised ordinance that gives them more legal teeth to achieve their mandate; the Environmental Health (Public Health) Unit, the Department of Fisheries & Marine Resources, and the Department of Environment who, as a result of this initiative, are going through a restructuring and refocusing exercise.

#### **Principle 4 - Ensure Meaningful Participation by Civil Society in Decision-making**

Accomplishment – Anguilla's implementation of the NEMS has brought about a new surge in CBOs. Even more astonishing is the Government's willingness to build the capacity of

civil society organisations to be able not only to participate in decision-making processes, but also to be able to assist in environmental conservation and management. Through partnerships with the Anguilla National Trust, Anguilla Beautification Club and ALHCS Environmental Club, young people in particular are being given a new lease on life by having them help shape the direction and sustainability of the country. As an Associate Member of the OECS, Anguilla's civil society is able to tap financial and technical resources from the UNDP Global Environment Fund (GEF) Small Grants Programme (SGP) to assist in environmental projects covering POPs, Land Degradation, Climate Change, Biodiversity, and International Waters. The reality is that, without our membership in OECS and our implementation of the NEMS – which are two of the criteria stipulated by the UNDP for an island from the sub-region to participate – Anguilla would have been lagging behind and would have been the laughing stock of the sub-region.

#### **Principle 12 - Protect Cultural & Natural Heritage**

Accomplishment – Anguilla is rich in both cultural and natural heritage resources. With its revised Marine Parks Bill, Anguilla National Trust Ordinance and the vesting of key terrestrial areas as national protected areas, the Government of Anguilla's actions in this regard are a testament to its implementation of the NEMS and the SGD. To accentuate the continuous work on this principle, plans are afoot for a regional workshop on Leadership and Governance of Marine Protected Areas to be held in Anguilla in November that will address the management and protection of Marine Parks. We in Anguilla realise that without collaboration with our sub-regional partners, the protection of sea turtles in our waters vis-à-vis our moratorium will prove futile if they are allowed to be harvested in another. Consequently, our work as a nation in this area is not only confined to Anguilla but in fact stretches to the sub-region.

#### **Principle 13 - Protect & Conserve Biological Diversity**

Demonstrating the Government's recognition that effective development truly requires sound environmental considerations, the Executive Council approved on the 4th October 2001, the Native Plant and Habitat Conservation (Biodiversity) Policy as a commitment to maximising the potential of the diverse natural resources of Anguilla. There are partnerships with RSPB, Society for the Conservation and Study of Caribbean Birds (SCSCB), WWK-UK, Durrell Wildlife Conservation Trust and others, so that biodiversity conservation is on a strong footing in Anguilla.

#### **Article 17 - Negotiate & Implement Multi-Lateral Environmental Agreements (MEAs)**

Accomplishment – Again, the implementation of the NEMS and the SGD required the involvement of the OTEP. Through funding from OTEP, Anguilla has been able to make significant strides towards the achievement of this principle. As a UK Overseas Territory, should Anguilla want to conform to certain MEAs, it must request that HM Government extend the necessary MEAs to the island. However, there were certain legislative frameworks that needed to be put in place and the OTEP project entitled “Technical Assistance for Drafting Environmental/Conservation Legislation for MEA Extension” provided the necessary resources to facilitate this process. This project has already yielded the output of a revised Anguilla National Trust Act, a Conservation Easement Act and an Anguilla International Trade in Endangered Species Act. These three pieces of legislation will be put before Government for approval before the end of 2006 for full approval, gazetting, and passage through the House of Assembly/Cabinet. There was also a considerable amount of public awareness that was built into this project and has yielded significant comments, and support from the community. This project comes to close during July 2007. However, before that, two other outstanding pieces of legislation remain to be completed:

- a) National Biodiversity and Cultural Heritage Act – this deals more with national biodiversity, ecosystems, species, biodiversity-related MEAs, and
  - b) An Environment Protection Act – this deals with pollution prevention control, waste etc.
- Both these two pieces of legislation are in their first draft.

What should be evident from the examples presented above is that the implementation of the NEMS and SGD has catalysed tangible enhancements in environmental management in Anguilla. In this context, I am using the term “tangible enhancements” to refer to observable and broad improvement in environmental quality. The NEMS has been instrumental in identifying what should be done and the agencies that should do it. Ultimately, we know however, that the Anguilla’s National Environmental Management Strategy will be successful only if, through implementing the measures it identifies, environmental considerations are routinely incorporated into decision-making at all levels and in all sectors.

### **NEMS vs. UK Environment Charter**

Some agencies and in unique cases individuals have sought to bring pressure to bear on Anguilla for what is perceived by them as refusal and/or failure to implement the UK Environment Charter. What is even more disheartening is that those who have sought to brand Anguilla as lacking environmental prioritisation are the same ones who are missing the mark when it comes to understanding the complementary and harmonising role that the UK Environment Charter plays to the SGD - NEMS or vice versa.

When they are placed side by side one can only assume that both the SGD-NEMS and UK Environment Charter documents are mirrors of each other. There is no question that Anguilla has not been flying the flag of the UK Environment Charter that it signed with H. M. Government in September 2001; but that is because any attempt to implement the Charter on its own and the SGD-NEMS on its

own would prove a wastage of resources and a duplication of efforts. The reality is that the 11 Commitments of the Government of Anguilla as articulated in the Charter are IN FACT being achieved and being worked towards through the implementation of the NEMS and the SGD. Every one of the Charter’s Commitments is covered under a Principle of the SGD-NEMS. Commitment 4 requiring EIAs be conducted as part of major projects is in fact a policy and a practice in Anguilla. Commitment 3, which calls for a multi-sectoral approach to consumption and production is covered under Principle 2 of the SGD-NEMS and as aforementioned is in fact being implemented. Commitment 6, which addresses the extension of MEAs is yet another clear example of how these two agreements are working hand in glove to ensure that Anguilla remains on course to “meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

The era of competing environmental policies and programmes are long gone. We are at a crossroads in our developmental stage and we must be sure to look at what is essential and what is practical and pragmatic for Anguilla amidst its limited resources. This focus on Anguilla does not require us to discard the NEMS or the Environment Charter. What it calls for, and what Anguilla has made a deliberate decision to do, is to ensure that they continue to complement, enhance and accentuate each other. We in Anguilla find that it is easier to achieve the mandates of the Charter by implementing the NEMS.

As I close, allow me to leave you with the philosophy of the Department of Environment on the matter of the SGD-NEMS vs. the UK Environment Charter. Our philosophy is that “Together We Aspire...Together We Achieve...and it is ONLY through collaboration of both Agreements that Anguilla will in fact move closer to ensuring there is preservation for generations, which will be achieved because of our strength and endurance.”



# Bermuda's biodiversity strategy implementation and its Environment Charter

Jennifer Gray, Bermuda Conservation Service, Bermuda Zoological Society & Bermuda Audubon Society



Gray, G. 2007. Bermuda's biodiversity strategy implementation and its Environment Charter. pp 86-90 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The Biodiversity Strategy and Action Plan have been more than just the publication of a document. Rather, it has been a process in which people from a wide range of backgrounds have come together to exchange ideas, develop solutions which are grounded in reality, and provide a clear, step-by-step approach for ensuring that our conservation targets can be met.

In 2000 the Government of Bermuda embraced and supported the concept of the BSAP which was officially launched by the Ministry of the Environment at the UKOT Conference hosted in Bermuda in March 2003

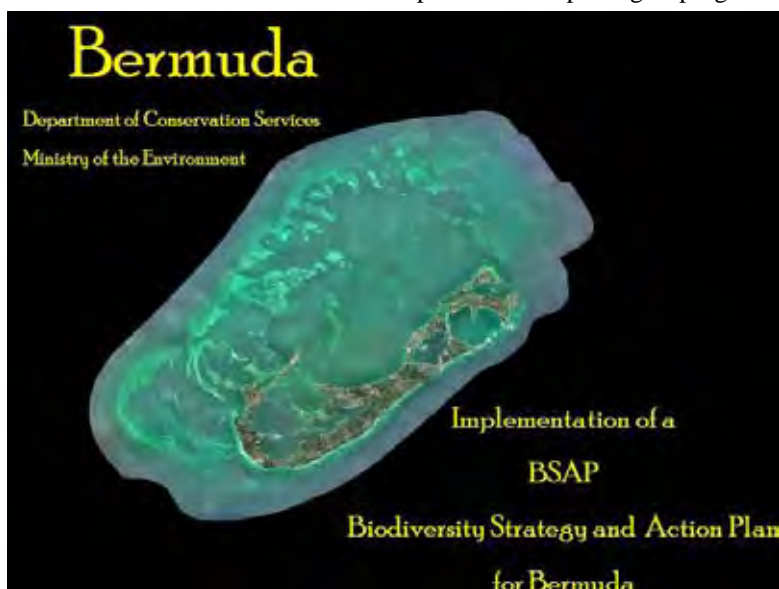
In September of 2005 the Ministry of the Environment hired a BSAP coordinator and provided an operating budget for implementation. The Biodiversity Strategy and Action Plan Coordinator, under the direction of the Director of Conservation Service, administers and supports the implementation of the BSAP. By liaising with all key stakeholders to monitor, promote and report on actions identified in the plan we can better facilitate progress toward its stated objectives. The BSAP provides a forum for us to work together, to learn from each other and exchange ideas, and to build on the very strong foundations that already exist to protect our unique wildlife.

To date numerous meetings with stakeholders have been held to review existing commitments, document progress and assess the relevance and potential impact of each BSAP action based on current issues and needs. To complete this process many more meetings and workshops will be held in 2006. This essential and time consuming process will lead the way to increased positive and coordinated action for conserving our biodiversity and their associated habitats through a widely accepted and effectively current plan of action.

Increased collaboration amongst NGOs and with Government agencies has been accomplished and reporting of progress toward objectives is being pursued. It is

intended that by the end of 2006 a full report detailing progress to date will be made available to all stakeholders. Enhanced monitoring and reporting of activities will be an integral part of any fresh collaboration moving forward.

In addition to strengthening ties with NGOs and members of the community efforts have also been initiated to increase public awareness of conservation issues. These include but are not limited to publishing of conservation ads, improved community outreach and engagement through the implementation of an interactive BSAP list serve, an innovative Conservation Services Website, public lectures, educational programmes and increased media coverage



on conservation issues. Action for the environment as outlined in the BSAP is the driving force behind a group of volunteers who meet regularly to serve the environmental community under the BSAP coordinator.

A major boost toward the implementation of the BSAP and the Environmental Charter was Bermuda Government's announcement in January of 2006 to take receipt of the draft Sustainable Development Plan for Bermuda. In June of 2006 the Draft Sustainable Development Strategy and Implementation Plan for Bermuda was released and the public consultation phase launched. A main objective of the plan is to continue to implement the BSAP. This development ensures central Government support in promoting and monitoring the success of the plan. Having BSAP accepted as a major plank in this keystone plan for the future is a major step forward for conservation in Bermuda.

**Jennifer Gray**, (Bermuda Conservation Service, Bermuda Zoological Society & Bermuda Audubon Society) Bermuda Government Conservation Services, P O Box FL145, Flatts, Bermuda FLBX. [jagray-c@gov.bm](mailto:jagray-c@gov.bm)

The Biodiversity Strategy and Action Plan for Bermuda is not just a document that sits on a shelf. Rather, it has been a process in which people from a wide range of backgrounds have come together to exchange ideas, develop solutions which are real and are provided in a clear, step-by-step approach for ensuring that our conservation targets can be met. The plan is focused around the following twelve main 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

The efforts of the Bermuda Biodiversity Project team and the Department of Conservation Services have shown that collaboration

across organizations and a passion for what you want to achieve can lead to success. It should be noted that the BSAP for Bermuda was initiated by an NGO resulting in perhaps a longer time to the goal. Our BSAP took some five years from inception to implementation. In 2000 the Government of Bermuda first embraced the concept of the BSAP and the consultative process began.

In 2001 the Ministry of the Environment publicly endorsed the BSAP which was, at that time, being developed by the Bermuda Biodiversity Project and Flora and Fauna International through a grant from the UK Government's Darwin Initiative.

In 2003, the BSAP was officially launched during the UKOT conference hosted in Bermuda. It was recognized by our Government that the plan would support our commitment to the Environmental Charter and our desire to meet the international obligations as laid out by the CBD.

An essential component of BSAP was the establishment of a coordinating unit. In 2005 the Government cemented its commitment to the plan by appointing a full time employee tasked with coordinating, facilitating and monitoring implementation of the plan by the many lead and partner agencies. By the end of 2005 the office of the BSAP Coordinator was occupied and an operating budget in place.



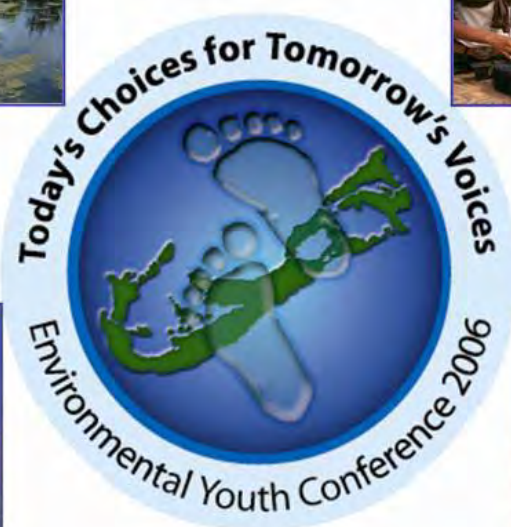
moving forward.

There are too many completed activities and successes to report on in the time given today but a few are worth mentioning. The creation of an environmental coalition called ECO has been particularly effective. ECO is comprised of delegates from each of the fifteen or more environmental NGO's, Government representa-

Getting all our 'ducks in a row' was the first challenge of the coordinator. The BSAP is some 68 pages jam-packed with 400 activities identified to support 77 actions under each of the 12 aforementioned objectives and involves a multitude of stakeholders.

tives and a few key individuals. The group meets regularly to share knowledge, discuss the issues of the day and most importantly support each other in efforts to promote a better Bermuda.

Numerous meetings with stakeholders have been held to review existing commitments, document progress and assess the relevance and potential impact of each BSAP action based on current issues and needs. In this monitoring process increased collaboration amongst NGO's and with Government agencies has been accomplished. It is intended, to have a full report made widely available. Enhanced monitoring and reporting of activities will be an integral part of any fresh collaboration







## Action for the Environment

are not limited to the publishing of conservation ads, improved community outreach and engagement through the design of an interactive BSAP list serve, planning for an innovative Conservation Services Website, public lectures, educational programmes and increased media coverage on conservation issues. An Environmental Youth Conference organised by the BSAP coordinating unit in collaboration with NGO's and experts in the field targeted youth delegates and teachers from all schools in the islands in an exciting and full programme of environmental learning.

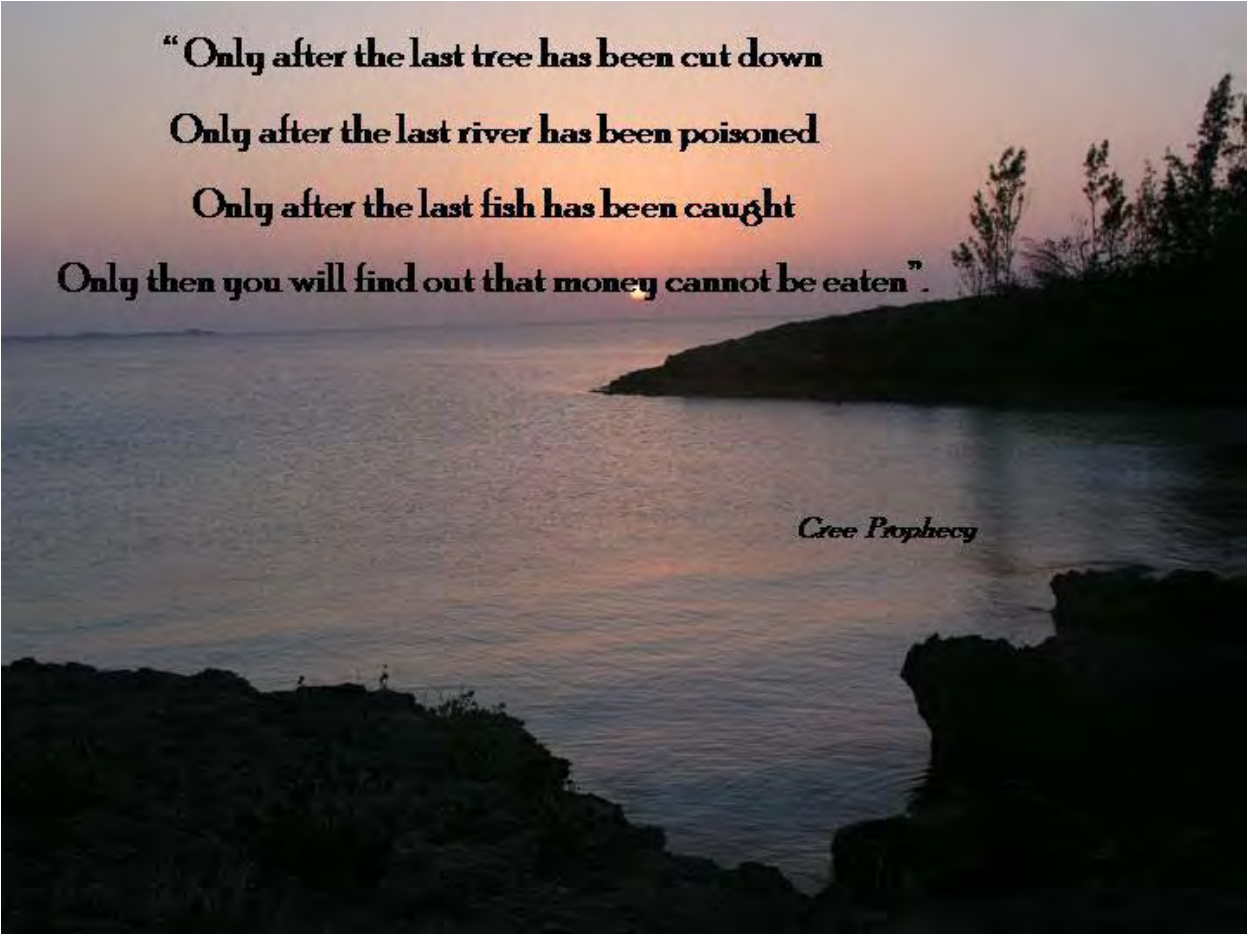
Action for the environment as outlined in the BSAP is the driving force behind a group of volunteers who meet regularly to serve the environmental community under the BSAP coordinator.

A BSAP Steering Committee has been established and meets regularly to guide the direction of the BSAP. They will review financial plans and programmes, identify priority actions moving forward; supervise BSAP's

performance and the process of receiving and dispersing funds.

A major boost toward the implementation of the BSAP and the Environmental Charter was Bermuda Governments announcement in January of 2006 to take receipt of the draft Sustainable Development Plan for Bermuda. In June of 2006 the Draft Sustainable Development Strategy and Implementation Plan for Bermuda was released and the public consultation phase launched. The BSAP has been embraced as a pillar of that plan. This recent development ensures central Government support in promoting and monitoring the success of the BSAP.

There is no doubt that there is an environmental awakening emerging in Bermuda and we hope that the BSAP will be the tool that brings this awakening to an island-wide change in behaviours that will benefit our precious biodiversity.



**“Only after the last tree has been cut down  
Only after the last river has been poisoned  
Only after the last fish has been caught  
Only then you will find out that money cannot be eaten”.**

*Cree Prophecy*



# Tristan da Cunha Biodiversity Action Plan 2006-2010

**Simon Glass, Conservation Officer, Tristan da Cunha**



Glass, S. 2007. Tristan da Cunha Biodiversity Action Plan 2006-2010. pp 91-92 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

A presentation was given on the Biodiversity Action Plan (BAP) for Tristan. The presentation gave a brief outline of the BAP and outlined what issues went well with the BAP and what did not go so well, as well as lessons learnt.

**Simon Glass**, Conservation Officer, Government of Tristan da Cunha, Tristan da Cunha. [tdcenquiries@stratosnet.com](mailto:tdcenquiries@stratosnet.com)



## Background

The biodiversity of Tristan is of global importance and faces significant threats. At the same time livelihoods (fishing, tourism) on Tristan are dependent on the conservation of its natural assets. The purpose of the Darwin project was to strengthen local capacity on Tristan so that biodiversity is conserved and therefore livelihoods secured in the long-term.



## Vision

The vision is to enable the people of Tristan da Cunha, in partnership with organisations from around the world, specifically UK and South Africa, to halt or in the case of some species and habitats, reverse the rate

of biodiversity decline on Tristan.

## Objectives

1. Conservation is integrated into all Government programmes, policies and plans.
2. Support for biodiversity conservation is strengthened on Tristan.
3. Tristanians have the capacity to manage biodiversity effectively.
4. The impact of invasive alien species is reduced or eliminated.



5. The sustainable use and management of the marine environment is enhanced.
6. The knowledge of Tristan's key habitats and species is increased.

## Achievements and lessons

A major achievement of the project is that Tristan is now in a stronger position to manage effec-





tively its biodiversity. A biodiversity action plan is prepared, an environment fund established, conservation laws have been revised, a conservation office is under construction, a satellite communication system is in place and Tristanians have been trained. The Government has demonstrated its commitment to biodiversity by employing a local conservation officer full time to take forward proposals in the BAP. Another major achievement is that the entire population were aware of the project. Every family has had the opportunity to be involved.

Activities that did not go so well was the establishment of the monitoring systems. Fieldworkers were trained to use one method of monitoring for

two summers, which was changed in the third year. They had to learn new methods within a period of three months. It is important that methods are agreed at the start of a project and stay the same to avoid confusion among fieldworkers.



The main lessons learnt were it took more time than expected to conduct fieldwork because of the terrain and climate. Also it will not be possible for the Tristan Island Government alone to carry out all the activities set out in the Biodiversity Action Plan - some external assistance is required for bigger projects such as rodent eradication and the continuation of the invertebrate survey.

# An approach to strategic environmental planning in a Crown Dependency

**Roland Gauvain, Alderney Wildlife Trust**



Gauvain, R. 2007. An approach to strategic environmental planning in a Crown Dependency. pp 93-94 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The presentation placed Alderney within the structure of the Crown Dependencies, and outlined Alderney's current position in regards to environmental legislation, policy and strategy. It then considered the potential for making use of the Environmental Charter framework, covering the Trust's /States [Government] of Alderney's plans to use the Charter as a policy framework to help with the development of local strategic planning - as well as the potential for the long-term integration within this of, for example, the Ramsar Management Strategy.

**Roland Gauvain**, Alderney Wildlife Trust, 34 Victoria Street, St Anne, Alderney GY93TA, Channel Islands. [manager@alderneywildlife.org](mailto:manager@alderneywildlife.org)

## An Overview

Alderney is part of the Bailiwick of Guernsey. Alderney is self-governing apart from some key services managed by the Bailiwick. The main island is 9 km<sup>2</sup> of land but Alderney owns and controls its own seabed of 150 km<sup>2</sup>. The human population is 2400.



## What's Missing on Alderney

Local government has no formal responsibility for its environment. Consequently, there is as yet no policy framework. There is one bird protection act. Otherwise, there is no environmental or environmental impact assessment (EIA) legislation.







There is no island plan, economic, social, building or environment. There is no civil servant with a responsibility for the environment

Alderney is included in UK's ratification of the Ramsar Convention on Wetlands and the Bonn Convention on Migratory Species, but not to most other relevant multilateral environmental agreements. Under the Ramsar Convention, Alderney recently designated the first Wetland of International Importance in the Bailiwick.

### Finding A Way In

The Alderney Wildlife Trust was formed in 2002 to start to rectify the imbalance.

The government has acknowledged the need for environmental protection and the EIA concept has



been accepted in green-belt planning issues

### An Environmental Charter

Alderney is using the UKOT example of Environment Charters to drive forward a process. However, this is being done in isolation by government and NGO in Alderney, without support from the UK Government or the Bailiwick of Guernsey support

The Environmental Charter is being used as a statement of intent in a new island plan, linking environment with all other aspects of island life. The process is running parallel to the development of the Marine Consents Act, which includes an EIA framework.





# Multilateral Environmental Agreements and UKOTs/CDs - a need for more guidance?

**Elizabeth Charter, Head of Isle of Man Wildlife & Conservation Division**



Charter, E. 2007. Multilateral Environmental Agreements and UKOTs/CDs - a need for more guidance? pp 95-97 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Some of the internationally most important wildlife on British soil (and waters) is in Overseas Territories. As such we need to use the international agreements system to protect it. Despite help which has been given to assist territories in meeting the obligations of the agreements to which they have signed up, there is still scope to raise the profile of conservation in some places and to raise awareness of the importance of the unique and endemic wildlife present. It is difficult for islands which are non-sovereign states to be players on their own in international conservation. I am all too aware how familiarity with rare or internationally important species and habitats on the Isle of Man leads to reduced sense of urgency in conserving them. In this short presentation, several questions are raised for colleagues to consider, including:

Which key agreements?

How do these conventions work and what do they all aim to do?

How should they be used by Governments?

How can they be used by NGOs?

How can the HM Govt help, and what would participants like to see in the way of support for international level conservation?

**Elizabeth Charter**, BSc, MSc, MIEEM, Senior Wildlife and Conservation Officer, Department of Agriculture, Fisheries and Forestry, Isle of Man Government, Knockaloe, Patrick Peel IM5 3AJ, Isle of Man. [liz.charter@gov.im](mailto:liz.charter@gov.im)

## Introduction

The purpose of this short presentation is to identify ways in which the Isle of Man has sought guidance on Multilateral Environmental Agreements (MEAs) and ask what would be useful to other islands.

Despite help which has been given to assist territories in meeting the obligations of the agreements to which they have signed up, there is still scope to raise the profile of conservation in some places and to raise awareness of the importance of the unique and endemic wildlife present. The Isle of Man, like Jersey, is without an Environmental Charter, but finds the MEAs very valuable to provide the drivers for conservation.

## Some key agreements

Before the Wildlife Office was established

in 1998, the Island had agreed to the UK ratification being extended to the Island for a number of agreements, including Ramsar and Bonn (Convention on Migratory Species). It has taken some time to start to comply with the Ramsar, but last month the first Ramsar site at Ballaugh Curragh was formally launched. We have been working towards having a



wetland inventory, and currently there is a database officer working on that project. In addition, it has been enormously valuable to be able to accompany the UK delegation to the Ramsar Conferences of Parties.

The Island has yet to embrace the Convention on Biological Diversity. At the suggestion of a Defra officer, we invited the World Conservation Monitoring Centre to undertake an evaluation of what we were doing and what we had still to do to comply. We found we were already well down the road to meeting the requirements. In view of the aspirational nature of this convention, it is possible to sign up and work towards compliance slowly as resources become available. The question we are facing, and which may arise elsewhere, is: is it better to become a signatory without resources and trust that resources will be come available after signing, or wait for agreement to commit resources before recommending signing?

Complying with Convention on International Trade in Endangered Species (CITES) requirements when not in the EU but part of a common trading area has created a particular difficulty for the Isle of Man. It is a difficulty which we have still to resolve, and we are requesting a bilateral agreement

with the EU to enable us to be treated as part of the EU for the purpose of CITES, while agreeing to adopt mirror legislation.

Obtaining international recognition for the habitats and species present on the Isle of Man is important – but to Overseas Territories, which have some of the internationally most important wildlife on British soil (and waters), it is even more significant. We need to use the International agreements system to protect it. However it is difficult for islands which are non-sovereign states to be players on their own in international conservation.

### How do these conventions work and what do they all aim to do?

For those here who are less familiar with how these conventions work this is a very brief summary.

Convention text are made up of articles, ratified once there are enough signatories. Resolutions from conferences (usually every 3 years) on key subject areas develop, expand on, and provide guidance on the intentions in the articles. National reporting takes place to identify how intentions are being followed through with action.

#### Inclusion of UK Overseas Territories and Crown Dependencies in some key multilateral environmental agreements

Territory	WHC	Ramsar	CITES	CBD	CMS	ASCOBANS	ACAP	AEWA	Eurobats	Turtles
Bailiwick of Jersey	no	yes	yes	yes	yes	no	-	?	yes	n/a
Bailiwick of Guernsey	no	yes	yes	no	yes	no	-	?	yes	n/a
Isle of Man	yes	yes	yes	no	yes	no	yes	yes	yes	n/a
Anguilla	yes	yes	no	no	no	n/a	-	n/a	n/a	n/a
Bermuda	yes	yes	yes	no	yes	n/a	-	n/a	n/a	n/a
British Antarctic Territory	no	no	no	no	no	n/a	yes	n/a	n/a	n/a
British Indian Ocean Territory	no	yes	yes	no	yes	n/a	-	n/a	n/a	yes
British Virgin Islands	yes	yes	yes	yes	yes	no	-	n/a	n/a	n/a
Cayman Is	yes	yes	yes	yes	yes	n/a	-	n/a	n/a	n/a
Cyprus Sovereign Base Areas	yes	yes	?	?	yes	n/a	n/a	?	?	n/a
Falkland Is	yes	yes	yes	no	yes	n/a	yes	n/a	n/a	n/a
Gibraltar	yes	yes	yes	yes	yes	n/a	-	-	yes	n/a
Montserrat		yes	yes	no	yes	n/a	-	n/a	n/a	n/a
Pitcairn Island	yes	yes	yes	no	yes	n/a	-	n/a	n/a	n/a
St Helena, Tristan da Cunha & Ascension Island	yes	yes	yes	yes	yes	n/a	yes (TdC)	no	n/a	n/a
South Georgia & South Sandwich Is	yes	yes	yes	no	yes	n/a	yes	n/a	n/a	n/a
Turks & Caicos Is	yes	yes	no	no	yes	n/a	-	n/a	n/a	n/a

WHC = World Heritage Convention

Ramsar = Convention on Wetlands

CITES = Convention on International Trade in Endangered Species

CBD = Convention on Biological Diversity

CMS = Bonn Convention on Migratory Species; the following are Agreements under that Convention:

ASCOBANS = Agreement on Small Cetaceans of the Baltic and North Sea

ACAP = Agreement on the Conservation of Albatrosses and Petrels

AEWA = Agreement on the African Eurasian Waterbirds

Eurobats = Bats in Europe

Turtles = Indian Ocean Turtle MOU

HM Government is the contracting party and it extends the UK's ratification to a territory if the territory's government request it.

MEAs are more or less dependent on the voluntary approach by the parties signing up to intentions, enacting these intentions and then reporting on their progress. Most articles commit countries to putting in place legislation to protect species and habitats, both in situ and from trade.

### **How should they be used by Governments?**

Contracting governments are expected to bring in legislation, enforce this legislation and report on how effective they have been in dealing with the conservation issue. These agreements need to be referred to in a Territory's strategic documents such as planning strategies, Environmental Charters, land use strategies and policies.

UK authorities report for all Overseas Territories and Crown Dependencies, and attend Conferences of Parties representing them as well as metropolitan UK. The ways in which Territory's progress and actions are included in national reports is an area for discussion.

### **How can they be used by NGOs?**

The non governmental organisations which are familiar with the requirements of these conventions can remind politicians of the commitments they have made. They also have a role in reminding governments at reporting time of the good work done locally by all the partners in conservation projects which meets the convention's objectives.

### **Is there a case for more guidance from HMG?**

It is suggested that HM Government departments and agencies should be keeping up the dialogue on what contracting parties should be doing, and providing resources to train personnel and establish management systems (capacity building). Critical stages in conservation which are often not recognised by authorities, and therefore need encouraging are:

- quality biological databases and mapping systems,
- value of field personnel with identification skills, and

- local people with habitat management knowledge and skills.

HM Government has a role in ensuring a meaningful reporting process is developed, using reporting formats which are as clear as possible and avoid too much overlap between different agreements. There are opportunities to contract UKOTCF, IUCN or other organisations to advise, undertake reviews (e.g. recently on Ramsar), chase potential funding sources, organise workshops, and perhaps coordinate volunteer support.

Opening this to the whole conference, what would delegates like to see in the way of support for international level conservation?

Other sources of guidance

CBD assessment:

<http://www2.wcmc.org.uk/cbd/assessment/index.html>

Harmonisation of reporting:

<http://www.unep-wcmc.org/conventions/harmonization/index.htm>



# Poster: Pitcairn Islands Environmental Management Plan

**Noeleen Smyth, Steve Waldren, Jim Martin, Botanical, Environmental & Conservation Consultants and Naomi Kingston, National Parks and Wildlife Service, Republic of Ireland**



Smyth, N., Waldren, S., Martin, J. & Kingston, N. 2007. Pitcairn Islands Environmental Management Plan. pp 98-99 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Pitcairn Island, a member of the Pitcairn Group, is located in the South Pacific Ocean. The island is remote, with a small population and a relatively underdeveloped infrastructure. The flora of Pitcairn is unique, with a number of endemic and endangered species. Challenges exist for nature conservation on the island, including invasive non-native species, soil erosion and infrastructural development issues. Careful environmental management is needed to ensure sustainable development.

Environmental Management Plans are a necessity in the modern age as they promote the integration of environment with planning and development issues. The aim of this project is to deliver an Environmental Management Plan for the Pitcairn group by the end of 2006. This Environmental Management Plan will enable sustainable development to proceed alongside environmental protection and conservation of local natural resources. It will provide the framework by which all activities that impinge on the environment can be regulated to the benefit of the people of Pitcairn Island and HM Government.

BEC Consultants are sourcing information on policy issues, legislation and island practices and are working in conjunction with the stakeholders to prioritize the current and anticipated environmental concerns. The first draft Environmental Management Plan for the Pitcairn group is currently available from: [pitcairncharter@yahoo.ie](mailto:pitcairncharter@yahoo.ie).

**Noeleen Smyth, Steve Waldren & Jim Martin**, Botanical, Environmental & Conservation Consultants, 27 Upper Fitzwilliam Street, Dublin 2, Ireland. [pitcairncharter@yahoo.ie](mailto:pitcairncharter@yahoo.ie) [www.botanicalenvironmental.com](http://www.botanicalenvironmental.com);  
**Naomi Kingston**, National Parks and Wildlife Service, Department of Environment and Local Government, 7 Ely Place, Dublin 2, Ireland.



# Pitcairn Islands Environment Management Plan



Smyth, N., Waldren, S., Martin, J., Kingston, N.

[pitcairncharter@yahoo.ie](mailto:pitcairncharter@yahoo.ie) and <http://www.botanicalenvironmental.com>

## Facts and Figures

- Pitcairn Group consists of four islands – Pitcairn, Henderson, Oeno & Ducie (Fig. 1). Total land area is 43km<sup>2</sup>
- Pitcairn Island is the only currently inhabited island in the group with a population of 48 people descendants of the "Bounty" Mutineers. Pitcairn, Oeno & Henderson had former periods of Polynesian occupation
- All islands in the group are volcanic in origin with Oeno, Henderson and Ducie having developed carbonate caps and formed atolls.
- Priority Bird area (Birdlife International)
- 162 species of native vascular plants (20 of which are endemic) and 250 introduced species.

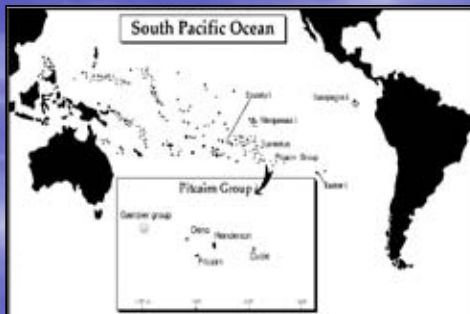


Figure 1: Location of the Pitcairn Island group in the South Central Pacific Ocean



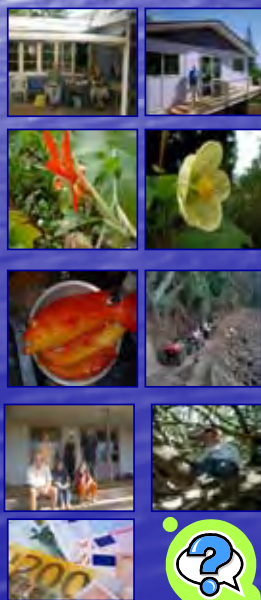
Pitcairn Island – view over sole settlement at Adamstown

## Process in developing the Environment Management Plan

- Environment Charter Guiding principles
- Existing Environmental Legislation
- Stakeholder consultation



## Pitcairn Islands Environment Management Plan (PEMP)



- Land use guidelines
- Housing guidelines
- Water & waste disposal guidelines
- Conservation of threatened species
- Control of invasive species
- Designation of protected areas
- Habitat restoration
- Environment impact assessment
- Energy production
- Local produce and souvenirs
- Tourism
- Infrastructure
- Fisheries and the Marine
- Environmental awareness campaign
- Environmental education in school
- Formation of a committee
- Funding to support PEMP actions

### 1. Social & Economic Planning

### 2. Habitats, Species & Landscape Planning

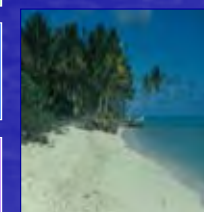
### 3. Environment & Development planning

### 4. Environmental education and awareness

### 5. PEMP Implementation & Legal Provision



Ducie Island – coral atoll



Oeno Island – coral atoll

# Fulfilling HMG commitments - Foreign and Commonwealth Office

**Helen Nellthorp, Deputy Head of Overseas Territories Department, and Shaun Earl, Overseas Territories Environment Programme Manager, OTD, Foreign & Commonwealth Office**



Nellthorp, H. & Earl, S. 2007. Fulfilling HMG commitments - Foreign and Commonwealth Office. p 100 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

**Helen Nellthorp**, Deputy Head of Overseas Territories Department, and **Shaun Earl**, Overseas Territories Environment Programme Manager, OTD, Foreign & Commonwealth Office, King Charles Street, London SW1A 2AH, UK.  
[shaun.earl@fco.gov.uk](mailto:shaun.earl@fco.gov.uk)

We are representing the FCO's Overseas Territories Department. UK government has agreed ten international strategic priorities (SPs). Under SP10, the FCO leads on co-ordinating HMG's responsibility, as set out in the 1999 White Paper on the Overseas Territories, for the security and good governance in the Overseas Territories.

As part of our work on this priority, we support the UK Overseas Territories in their implementation of international obligations, and support their sustainable long-term development.

Since the start of this financial year (2006-7), our programme work in the UKOTs has had a more strategic focus. The UK OT Environment Programme (OTEP) is now part of a larger UK OT Programme Fund (OTPF) of £4.8m. OTPF funds a wide range of projects and programmes supporting sustainable development.

The FCO remains strongly committed to supporting the UKOTs' work on the environment. This is shown by our continued support to OTEP. We have ring-fenced funds of £469,000 per annum. We are also prepared to consider good quality environment-related programmes, particularly those with a regional focus and evidence of UKOT government support, for funding under the wider OTPF.

The most recent OTEP bidding round focuses on: environmental governance; capacity building; invasive species; and climate change.

Under the Environment Charters, the UK Government and respective UKOT Governments have made joint commitments to *inter alia*: recognise

that all people can help to conserve and sustain their environment; to aim for solutions which benefit both the environment and development; to contribute to the protection and improvement of the global environment; and safeguard and restore native species and habitats.

We were interested to see Mike Pienkowski's presentation at the start of this session. As a starting point for our discussions today it would have been helpful if you had consulted FCO, DFID and DEFRA about our progress on our Charter commitments. A number of the UK Government commitments are to assist or facilitate UKOT Governments – who of course have the lead responsibility for their environment and government policies.

For the last three years, OTEP has funded projects in all these areas. Before that, the FCO's Environment Fund also contributed. But many of the charter commitments do not require large amounts of funding before they can be implemented. Most require a moral commitment from governments and civil society to ensure that environmental considerations are mainstreamed into all policies. We hope that this week's conference will contribute to this process. We also hope that the sharing of best practice and experiences will be invaluable for UKOT environmental experts.

The FCO and DFID are pleased that OTEP is a partner in this conference we hope it leads to some measurable outcomes in implementation of the Environment Charters, and ensuring a better understanding of progress on commitments. We look forward to continuing to work closely with all stakeholders.



# Fulfilling HMG commitments - Department for International Development

**Phil Mason, Head of Overseas Territories Department, and Dick Beales, Senior Natural Resources & Environment Adviser, Department for International Development**



Mason, P. & Beales, R. 2007. Fulfilling HMG commitments - Department for International Development. pp 101-102 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

DFID's Overseas Territories Department (OTD) aims to meet the reasonable development needs of the UK Overseas Territories and to promote their self-sufficiency. It draws its mandate from a combination of DFID's 1997 White Paper: *Eliminating World Poverty: A Challenge for the 21st Century*; the FCO's 1999 White Paper: *Partnership for Progress and Prosperity: Britain and the Overseas Territories* and the International Development Act 2002 (which expressly provides for assistance to the territories as an exception to the poverty-reduction criterion that applies to all other DFID assistance).

The main targets for its annual budget (approximately £30 million) are the territories of Montserrat and St Helena, and to a lesser extent Pitcairn Islands and Tristan da Cunha. The Department also has a regional programme supporting of a range of activities common to several territories, including HIV and AIDS prevention, law revision, human rights, child protection, and environmental conservation. Support for the last of these is provided mainly through the joint DFID/FCO Overseas Territories Environment Programme to which DFID allocated £1.5 million for the three year period 2003/04-2006/07.

**Phil Mason**, Head of Overseas Territories Department, and **Dick Beales**, Senior Natural Resources & Environment Adviser, Department for International Development, 1 Palace Street, London SW1E 5HE, UK. [PS-Mason@dfid.gov.uk](mailto:PS-Mason@dfid.gov.uk)  
[R-Beales@dfid.gov.uk](mailto:R-Beales@dfid.gov.uk)

I am really pleased to have been invited to this, my first, UKOTCF conference. I thought I could best contribute by saying a few words, for those who may not know how DFID comes into the picture, about DFID's mandate and the basis for our engagement with the Overseas Territories generally.

DFID (and HMG) policy towards the UKOTs derives from the international moral and legal responsibilities of sovereign governments towards their Territories. In particular, Article 73 of the UN Charter requires governments to accept, as a sacred trust, the obligation "to promote to the utmost ... the well-being of the inhabitants of these territories". This is the ultimate foundation of our responsibilities.

This obligation also carries or implies a wide range of international legal and reporting obligations for which, under international law, HMG is ultimately

responsible on behalf of the UKOTs. These include international norms and commitments on, for example, the environment.

DFID is governed by a specific piece of legislation - the International Development Act 2002. The main purpose of this Act was to ensure that development assistance is used primarily for poverty reduction purposes. However, in recognition of our obligations to, and the special circumstances of, UKOTs, the Act includes an explicit provision enabling DFID to support the UKOTs as an exception to our normal poverty reduction mandate.

The prevailing policy framework for DFID's engagement comprises the three key development objectives for the UKOTs reflected in the Government's 1999 White Paper. These are:

a) to maximise economic growth and self-suf-

ficiency through sensible economic and financial management, leading to graduation from such support where this objective is feasible;

b) to ensure in the meantime that basic needs are met, including the provision of essential infrastructure; and

c) to support the good governance of the territories, including the proper management of contingent liabilities and the fulfilment of the UK's international obligations - particularly of human rights and the multilateral environment agreements/obligations.

DFID's focus lies on the neediest territories (in terms of basic needs). We maintain full bilateral programmes with St Helena (including Tristan da Cunha), Montserrat and Pitcairn. Together, our programmes here currently amount to some £32m a year.

Our approach is very much one of partnership. We listen very carefully to what the needs are and respond accordingly. This is especially the case with our other channel of support which is how we reach most other territories: thematic cross-cutting programmes (in total around £1.6m) targeted on topics that are of common concern for all UKOTs: these include HIV/AIDS, human rights, child protection, law revision, disaster risk reduction - and, of course, the environment, manifested by the OTEP programme jointly with FCO.

On that, I am pleased to be able to announce confirmation that DFID will be supporting a new three-year round of OTEP, with a further £1.5m over the next three years carrying on when the existing one expires at the end of this FY.

As a relative newcomer to this family, I feel very welcome already. The territories are all unique in their own ways, and we try to respond accordingly. I know that financial constraints often bedevil us. I am looking at whether the way we approach the funding of the UKOT programmes we have delivers the optimal outcomes. I have in mind situations where expenditure spikes, for example on urgent infrastructure, cannot be met under existing programme ceilings with that leading to us spending a sub-optimal

amount - because that is what we can afford in the budget - and then having to spend more later because we could not do the job in full the first time round, with the result that we can often end up spending in aggregate more than what the original requirement was.

We might be able to manage these demands better if we took a longer perspective than the three years we currently are obliged to work to. I am exploring the scope with my centre for possibly looking at 10-year horizons. This is very much work in progress, and does not offer a panacea for every challenge faced by UKOTs. But I hope we can work more responsively to iron out some evident obstacles that stand in the way of better outcomes.



*Shaun Earl (FCO) and Dick Beales (DFID) at the poster displays*

# Fulfilling HMG commitments - Department of Environment, Food & Rural Affairs

**Eric Blencowe, Head Zoos & International Species Conservation, Department of Environment, Food & Rural Affairs**



Blencowe, E. 2007. Fulfilling HMG commitments - Department of Environment, Food & Rural Affairs. pp 103-104 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://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.

**Eric Blencowe**, Head Zoos & International Species Conservation, Department of Environment, Food & Rural Affairs (Defra), Zone 1/10a, Temple Quay House, 2 The Square, Bristol BS1 6EB, UK. [Eric.Blencowe@defra.gsi.gov.uk](mailto:Eric.Blencowe@defra.gsi.gov.uk)

It is a particular pleasure to be here in Jersey, the home of the Durrell Wildlife Conservation Trust, and I shall certainly be taking the opportunity to spend some time there.

I have been asked to say something about Defra's mandate. I want to outline how the biodiversity element of Environment Charters fits with Defra's remit, then give some examples of how we work with others to achieve our biodiversity aims, and finally give some pointers on what you might expect from us in the future.

Defra is a large department with a diverse range of priorities including climate change, sustainable farming, sustainable consumption and production, animal health and welfare, rural issues and of course natural resource protection.

For any of you who have read Defra's 2006 Annual report (and I suspect that is virtually all of you!), you will know that it states that Defra works for the essentials of life – food, air, land, water, people, animals and plants. One of its aims is to secure a better environment at home and internationally through the sustainable use of natural resources. And this is the hook for Defra's work in the area of biodiversity.

So what does this mean for the UKOTs and CDs?

I am sure that you are all aware of the UK government's commitments on the World Summit on Sustainable Development target to significantly reduce the rate of loss of biodiversity by 2010. This target is the main driver for our work.

One vehicle for addressing the 2010 target is through our membership of Multilateral Environment Agreements or MEAs.

One such MEA is the Convention on Migratory Species or CMS, and in a number of cases our interests in CMS daughter agreements are founded entirely on the UKOTs. The Agreement on the Conservation of Albatrosses and Petrels (ACAP) is one; the Marine Turtle MoU covering the Indian Ocean and South East Asia (including BIOT) another. Through these bodies we can direct expertise and funding to help bring about conservation gain.

A specific example is where Defra (through ACAP) and the FCO jointly funded a population census for petrels in South Georgia last year.

And, of course, UK membership of these MEAs is very much a two-way process. We receive much from you; our national reports for example are always well received, and this is very much down to your input. In addition you have informed our



positions at international meetings and have been members of UK delegations.

Of course, there are also areas where Defra acts unilaterally, through its various funding schemes.

You will all be aware of the Darwin Initiative, which focuses on capacity building and seeks to achieve real impact and legacy for biodiversity conservation. A number of highly successful projects have been funded in the UK Overseas Territories and applications from UKOTs are looked on favourably in the application process. To date, over £1.5 million has been used to fund UKOT projects.

A more recent initiative is the WSSD (World Summit on Sustainable Development) Implementation Fund. This fund seeks to accelerate implementation of the UK's WSSD commitments in areas where Defra leads. For example, a capacity building workshop was held earlier this year in Montserrat on the Global Strategy for Plant Conservation, with Kew Gardens and JNCC the key partners.

A smaller scale initiative worth mentioning is the Defra/FFI Flagship Species Fund. Its focus is primarily on primates, trees and marine turtles. For example, a marine turtle habitat restoration project in BIOT was carried out this year with support from both the FSF and OTEP. The FSF also oper-

ates a small grants fund whereby very small scale start-up projects can apply for funding through open-competition.

So what can you expect from Defra in the future?

Our grant regimes will continue to be available. Our work will continue to be based around the MEAs to bring about conservation benefits as well as tapping into the shared global expertise that membership brings.

Where we can we will support practical conservation projects through these agreements. However, our pot is limited, and the prospect of a significant funding increase for biodiversity is unlikely in the near future.

Instead we need to continue to work together to find creative solutions to the challenges we face.



Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, page 104

# Fulfilling HMG commitments - JNCC's involvement in supporting implementation of Environment Charters in the Overseas Territories

**Marcus Yeo, Director Resources & External Affairs, and Dr Vin Fleming, Head - International Unit / CITES Scientific Authority (Fauna), Joint Nature Conservation Committee**



Yeo, M. & Fleming, V. 2007. Fulfilling HMG commitments - JNCC's involvement in supporting implementation of Environment Charters in the Overseas Territories. pp 105-106 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

**Marcus Yeo**, Director Resources & External Affairs, and **Dr Vin Fleming**, Head - International Unit / CITES Scientific Authority (Fauna), Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough PE1 1JY, UK.  
[Marcus.Yeo@JNCC.gov.uk](mailto:Marcus.Yeo@JNCC.gov.uk) [vin.fleming@jncc.gov.uk](mailto:vin.fleming@jncc.gov.uk)

JNCC advises the UK Government on nature conservation issues affecting the whole of the UK and internationally. As part of this remit one of our strategic objectives is to 'promote measures that effectively protect and enhance biological and geological diversity in the UK Overseas Territories and Crown Dependencies'.

JNCC's current role in supporting nature conservation, and the implementation of Environment Charters, in the Overseas Territories and Crown Dependencies (hereafter referred to collectively as the 'Territories'), is modest. Examples of our input include advising on the implementation of multilateral environmental agreements (MEAs), participating in the advisory panel to the Overseas Territories Environment Programme, and commissioning a review of non-native species occurring in the Territories.

However, enhanced support for nature conservation in the Territories is essential if the UK is to meet its international commitments, such as significantly reducing the rate of global biodiversity loss by 2010, and we feel JNCC has an important contribution to make in assisting the UK to achieve this.

It is proposed that JNCC's future role should be:

- to engage at a greater level with strategic cross-territory issues
- to seek greater direct involvement with in-Territory projects, especially where these have a

broader application than to a single Territory alone and/or which would have wider applicability or contribute to capacity building

However, we recognise that any involvement by JNCC should:

- a) be built on collaboration and partnership with the Territories and other stakeholders,
- b) address subjects of mutual interest and
- c) focus on areas where JNCC involvement can add significant value (i.e. be based on our key strengths).

We need also to focus on those issues which are of greatest relevance to conservation in the Territories, such as non-native species or climate change, and, of course, should be guided by the Environment Charters or equivalents.

Potential examples of where JNCC might contribute include:

- stronger support to the implementation of MEAs in the Territories
- marine issues, especially fisheries, marine habitat mapping, seabirds and cetaceans, and the strategic and environmental impact assessments of offshore oil and gas exploration
- biodiversity surveillance and monitoring, including the development of indicators and management of biodiversity information
- climate change, including predicting/modelling potential impacts on the Territories' biodiversity, risk assessment, and measures that may be used to mitigate or adapt to these impacts

- the Ecosystem Approach and its application as a framework for sustainable development
- non-native species, including audit, prioritising species for control or eradication, and identification of preventative measures
- economic valuation of biodiversity, ecosystem goods and services
- Earth heritage conservation, including the potential for an overview of geodiversity interests within Territories.

We look forward to exploring how JNCC might assist Territories in the implementation of the Environment Charters.



Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, page 106



## Discussion

Several rapporteurs noted the wide-ranging discussions in this session. Some of the main points are noted here.

There was widespread agreement that the assessing of progress in implementing the Commitments under the Environment Charters (or their equivalents such as National Environment Management Strategies or others) was important if there is to be real progress. There was concern that less information had been supplied than would be desirable. There was some discussion of the difficulty in supplying information, although some of those who had already tried to supply such information from a territory said that it was not as difficult or time-consuming as it might look at first sight. Nevertheless, UKOTCF offered to develop a simpler data supply form. [This was done, resulting in a much fuller supply of information from the Territories, which has been incorporated in the updated report in this Topic section of these Proceedings.]

There was some discussion on what impedes progress on implementing good environmental practice in the Territories. Setting some clear, agreed objectives was a key, and several participants noted the value of facilitation (such as in Turks & Caicos and St Helena) in turning the commitments of Environmental Charters, Multilateral Environmental Agreements (MEAs) etc into operational activities. Once an action plan is agreed, what is needed to implement it? Some key elements identified are:

- The need for continued strong collaborative involvement of all players, governmental and non-governmental;
- The need for a post with the full-time role of co-ordinating between the players to drive the implementation forward;
- The need for maintained political support, and the recognition that implementation should be integrated fully into all activities, including those of Government;
- The need for financial resources (see also below).

Participants from some (but not all) territories noted that there remain challenges also in achieving an open approach to policy development, environmental planning, environmental impact assessments etc.

In respect of joining MEAs, there was some debate as to whether it is better to sign up to MEAs when one does not now have the resources

to implement (and resources will follow) or wait until the resources are available. There were strong arguments from the Territories in both directions. Perhaps the best answer is a variable approach. Some MEAs (such as CITES) have very precise requirements, so that it is necessary to implement in full on joining and have the resources to do so. Others (such as the Convention on Biological Diversity) include more aspirational (and probably no country is yet implementing everything in it), expecting increasing implementation with time, so that early sign-up may be more appropriate. Analyses can be undertaken identifying the needs and allowing countries to deal with the issues incrementally (as, indeed, was part of the analysis process in developing strategies for implementation of the Environment Charters for those countries that have done this).

There were a series of questions on:

- Why is so little spent by UK Government on the UKOTs and CDs?
- Is there an assessment by Whitehall on the needs to meet its international commitments in the UKOTs and CDs?
- How does Defra decide on its financial commitment (or lack of it) to UKOTs and CDs?
- Why is the small project funding in OTEP often limited to 2-year projects at most, when much of the work to meet Environment Charter commitments needs a longer time-frame?
- Why is it that there is a change in OTEP's focus as opposed to the issues addressed within the Environment Charter?
- Invasive (and other) issues are central to many commitments but can cost millions in implementation – where can a UKOT go to address the bigger issues of invasives in terms of funding?

It was noted that there has been no assessment to meet World Summit on Sustainable Development (WSSD) commitments. There was an acknowledgement of the low spend, but it was noted that officials cannot address the differences; it requires decisions by UK politicians.

In respect of Defra, it was noted that all priorities are set by Ministers in consultation with scientific authorities and public campaigns. It was thought that there was no consultation with UKOTs or CDs.

It was reported that OTEP's project timing is based on government's horizon of funding for three years. It was noted that it would be better if this

was a moving horizon, allowing a proportion of longer-term commitment. The possibility of an exploration for longer-term funding (perhaps a 10-year horizon) was widely welcomed.

On OTEP's focus, the independent review of OTEP had recommended an attempt to focus this more. In practice, OTEP projects often depend on opportunities for matching effort, in kind if not in money, and the timing of availability of this is variable. It is not now expected that any focusing will restrict OTEP from addressing any elements of the Environment Charters.

On work, such as Invasive issues, requiring higher levels of funding, no answer was provided. However, DFID was going to commission a study on additional funding sources, as part of HMG's commitment under the Charters to help UKOTs find funding beyond what is provided by HMG.

There was a deal of concern that the built and cultural heritage is becoming threatened by events, but does not benefit even from the small grants from UK Government available for the natural heritage. DFID noted that the amounts of money which might be needed in support of the built heritage could be huge, and well beyond the scope of OTEP. Some asked: are there opportunities for discussion with UK's Department of Culture, Media & Sport (DCMS)? It was suggested that DCMS does not have a mandate to deal with UKOTs (although it does lead, for example, on the World Heritage Convention, including for UKOTs & CDs). It was noted that tourism strategies are possible for the two UKOTs (St Helena and Montserrat) that can access programmatic assistance from DFID within the bilateral framework.

It was noted that other UK government departments are also involved, for example the Department of Constitutional Affairs (formerly the Lord Chancellor's Office and previously in the Home Office [and since the conference translated into Justice Department]), which is UK Government's link to the Crown Dependencies. The question was raised as to whether the Department of Constitutional Affairs and DCMS had been invited to the conference. They had, but had not responded to the invitations.

The question was raised as to how the UKOTs and CDs could be eligible for National Lottery funds? It was noted that this too came into DCMS responsibilities, but that the matter would be discussed

further in the Session on Resources, where we would learn about the better situation in the Netherlands.

It was noted that Bioverseas, involving UKOTCF in partnership with other umbrella organizations for French and Netherlands territories and European bodies, were working in parallel with governmental partners in OCTA, to encourage the opening of access to other European Union funds by UKOTs. This also would be explored further in the Resources session.

There was a general view from the Territories that DFID and FCO should work on an educational programme to sensitise other UK government departments.

When the UK reports on its MEA commitments, it has to include UKOTs and CDs. However, they have very limited capacity allocated to this, and have often requested, and received, unpaid assistance from UKOTCF, as well as the territories themselves. It was noted by the Territories that it was unfortunate that Defra had no focal point to interact with the UKOTs and CDs. The suggested answer of always working via FCO was not very helpful, because that simply involved a translation stage via an agency without technical knowledge of the subjects involved, especially since FCO had terminated its environmental posts.

In terms of Defra itself, it was noted that its declared focus on species and habitats did not really apply in its relationship with UKOTs and CDs. Domestic issues and international issues are dealt with separately in terms of funding, with UKOTs and CDs often falling into a gap between these. It was noted that, due to the asymmetry of British government arrangements, Defra is primarily an English department, which also has to take a domestic UK lead on some matters, and UKOTs and CDs represent yet another step. This leads to these being considered "international" – which seemed unfair and unreasonable to many present.

All participants were grateful to the panel for a welcome discussion. Inevitably, many of the questions had been directed at representatives of UK government bodies, and these were thanked particularly for discussing matters so constructively. The friendly and professional approach by all parties to the discussion was valued, even though it is difficult to give the impression of this in a brief summary of the discussions.

## Topic 4: Integration of conservation and sustainable livelihoods: Marine, including fisheries

**Session Organiser: Dr John Cooper, Chief Research Officer, Avian Demography Unit, Department of Statistical Sciences, University of Cape Town, South Africa, and an Honorary Conservation Officer, Tristan da Cunha**

This topic, the integration of conservation and sustainable livelihoods, relating to marine areas including fisheries, explores the complex and challenging nature of this task. The small islands of the UK Overseas Territories and Crown Dependencies have a large area of marine responsibility, so the key question is “How can they be managed and looked after effectively?” The session presentations and discussion explore this huge task.

An introduction by Dr John Cooper (circulated in advance) gives background information and proposes subjects for discussion. Reviews were commissioned on three topics. One of these (By-catch issues in fisheries within UK Overseas Territories and Crown Dependencies Territorial and Exclusive Economic Zone waters) proved too ambitious, but Grant Munro stood in to address by-catch issues in fisheries within UK Overseas Territories focussed on the South Atlantic. Dr Anne Glasspool reviewed development issues in the inshore marine zones of UKOTs/CDs. Dr Mike Brooke’s paper (presented by John Cooper in Mike Brooke’s absence) examined the role of Marine Protected Areas in improving the conservation status of UKOT/CD territorial and EEZ waters. Grant Munro, Anne Glasspool and John Cooper then formed a panel to lead the discussion, which is summarised after the reviews.

In addition, poster presentations from BVI (Management of Marine Protected Areas and the Marine Conservation Programme), Alderney (EIA and tidal power), Bermuda (Reef Ecosystem assessment and mapping) and Tristan da Cunha (conservation status of the critically threatened Spectacled Petrel) are included in this section.

### Introduction by session co-ordinator

**Dr John Cooper, Chief Research Officer, Avian Demography Unit, Department of Statistical Sciences, University of Cape Town, South Africa, and an Honorary Conservation Officer, Tristan da Cunha**



Cooper, J. 2007. Introduction to Integration of conservation and sustainable livelihoods: Marine, including fisheries. pp 109-111 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

**Dr John Cooper**, Avian Demography Unit, University of Cape Town, Rondebosch 7701, South Africa. [jcooper@adv.uct.ac.za](mailto:jcooper@adv.uct.ac.za)

### Introduction

In 1987, Sara Oldfield published a guide for conservation action in the United Kingdom Dependent

Territories (as the UK Overseas Territories were then termed), which she entitled *Fragments of Paradise*. When the total land area of the UK Overseas Territories (UKOTs) and Crown Dependencies



(CDs) are considered, it becomes obvious that one thing they have in common along with their fragmented nature is their small size. The largest (if we exclude British Antarctic Territory), the Falkland Islands, has an area of a little over 12 000 km<sup>2</sup>, and the smallest, including Anguilla, Ascension, Bermuda, Gibraltar and Pitcairn, have land areas of less than 100 km<sup>2</sup>. These are tiny sizes compared to those of continental nations. The United Kingdom has an area of a little over 240 000 km<sup>2</sup>, the United States covers a huge 9.8 million km<sup>2</sup> and even land-locked Andorra has an area of 468 km<sup>2</sup>. However, when territorial and Exclusive Economic Zone (EEZ) waters are included the situation is somewhat different. EEZ waters usually extend 200 nautical miles offshore and, compared to the land areas of UKOTs and CDs, these marine areas are many sizes larger. This makes, for example, the combined land and sea area of the Falkland Islands larger than that of Belgium – which is not a landlocked country. The 200-nm Maritime Zone encircling South Georgia and the South Sandwich Islands (with a total land area of only 4065 km<sup>2</sup>) makes for a political entity with a larger area than Switzerland.

The above comparisons would be of little significance if these marine components of UKOTs and CDs were of minimal value or interest. This is not the case, and a number of them are important for economic reasons, such as fisheries (e.g. Falkland Islands, South Georgia), oil exploration (e.g. Falkland Islands) and tourism (e.g. Caribbean UKOTs). Other marine areas, currently without significant economic activity, such as that of Pitcairn, may well harbour resources as yet unexploited or even yet to be discovered, including endemic and threatened species. One thing it may be assumed is that all UKOT and CD marine areas support habitats and biota of great conservation significance, although it is fair to say that all have been relatively little studied. Thus the primary challenge in ensuring sustainable development in UKOT and CD marine areas is how best to integrate the desire for economic development with the conservation of the habitats and species occurring within them.

### **Format of the discussion session**

The following notes outline the initial intentions, subject to modification in the session. The session coordinator (John Cooper) and the three session speakers (Mike Brooke, Anne Glasspool and Grant Munro) will form a panel to lead the discussion.

Inputs, preferably with specific examples and recommendations, from the session attendees will be encouraged and a rapporteur will record the salient points of the discussion and any specific recommendations. This record will form part of the Conference Proceedings, and will also link into the conference conclusions.

### **Subjects for discussion**

#### ***Ensuring existing and new marine fisheries are managed in a sustainable manner***

Matters to address include:

1. Are existing regulations adequate?
2. Is by-catch minimized (are FAO National Plans of Action in place)?
3. Are fisheries and fishery zones adequately patrolled, including against IUU (Illegal, Unregulated and Unreported) fishing?
4. Are resource research programmes adequate?

#### ***Ensuring tourism and other development activities are properly managed***

Matters to address include:

1. Are existing regulations adequate (pollution, dredging, etc.)?
2. Is income from development activities adequately supporting conservation efforts?

#### ***Protecting habitats and species***

Matters to address include:

1. Are there lists of threatened marine species with suitable levels of protection defined?
2. Do species action/management/recovery plans exist or are they planned for these threatened species?
3. Are there sufficient Marine Protected Areas in existence or planned (including sea mounts within EEZs)?
4. Are quarantine procedures adequate to protect marine biodiversity (e.g. regulations and inspections pertaining to ballast dumping, hull fouling, mariculture, etc.)?

#### ***Making use of international bodies***

Matters to address include

1. What can be the value of World Heritage and Ramsar Wetlands of International Importance Conventions, and other conventions (e.g. CBD, CMS, CITES)?
2. Can membership of and inputs to Regional Fisheries Management Organizations (RFMOs) help manage resources?
3. How can the Agreement on the Conservation of Albatrosses and Petrels (ACAP) support species protection?

### ***Resourcing conservation efforts***

Matters to address include:

1. Do individual UKOTs and CDs have sufficient resources in the way of funds, infrastructure and qualified personnel to undertake the necessary conservation management activities identified above?
2. If such funds and resources are inadequate how can they best be obtained (training, NGO and private sectors, tourist levies, fishing licenses, UK grants-in-aid (e.g. OTEP), etc.)? (Note that this links into the Resources session.)

NOTES: the above lists only some of the possible areas for discussion and is intended to act as an impetus, and not a prescription. Attendees are encouraged to bring up other issues. It will be most helpful if these could be imparted to a member of the panel prior to the session, to ensure adequate time is made available.

# Review 1: By-catch issues in fisheries within UK Overseas Territories in the South Atlantic, with special reference to the Falkland Islands

Grant Munro, Falklands Conservation



Munro, G. 2007. By-catch issues in fisheries within UK Overseas Territories in the South Atlantic, with special reference to the Falkland Islands. pp 112-121 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The incidental by-catch and mortality of non-target taxa by a wide range of fishing methods constitutes a critical threat to many vulnerable species including marine mammals (seals and cetaceans), turtles, sharks and seabirds. Many fishing methods are relatively unselective and indiscriminate in the marine species they target. Catches may contain undersize fish and non-commercial fish species, and “high-grading” of catches to optimise the value of restricted quota, all lead to a high level of fisheries discard. This can cause significant impacts to the marine ecosystem and affect prey availability for higher predators. However, the decline of many species, most notably albatrosses, turtles and sharks, and the increase in dedicated observer programmes, have highlighted the significant incidental mortality of non-target taxa through capture, entanglement or collision.

The *Code of Conduct for Responsible Fishing* of the Food and Agriculture Organization of the United Nations’ and its associated *International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries* (IPOA-Seabirds) recognise the need to minimise incidental mortality if sustainable fisheries and species biodiversity are to be maintained. However, such assessments require data not only on by-catch but also on the dispersal of impacted species at sea, so as to determine the overlap of foraging ranges with fisheries. The lack of resources in many UK Overseas Territories, coupled with the inability to monitor and control extended maritime zones, mean that little data exist on incidental mortality and may lead to unreported fisheries activities. It has been shown that voluntary reporting significantly underestimates catches and may hide the extent or even existence of by-catch. There is thus an urgent need for data collection from dedicated marine observers to enable risk assessments to be undertaken and subsequent advocacy and mitigation methods to be undertaken and adopted.

In the Southern Ocean, 19 of 21 species of albatrosses are currently classified as globally threatened by the World Conservation Union (IUCN). Population declines are attributed to incidental mortality associated with fisheries activities. Longline, trawl and jig fisheries may all lead to incidental seabird mortality. Thousands of seabirds are killed annually on long lines as they dive on baited hooks during setting, an un-quantified number collide with trawl warps as they forage on discards and yet more may be deliberately targeted as food by jigger crews.

The process from initial identification of the problems, through quantification and mitigation development, is followed from data and experience in the Falkland Islands, South Georgia, Tristan da Cunha and in adjacent areas, such as South African waters and on the Patagonian Shelf, where birds forage. This highlights the problems but also the successes that can be achieved if effective monitoring and mitigation implementation are adopted.

**Grant Munro**, Falklands Conservation, PO Box 26, Stanley, Falkland Islands;  
[grant.munro@conservation.org.fk](mailto:grant.munro@conservation.org.fk)

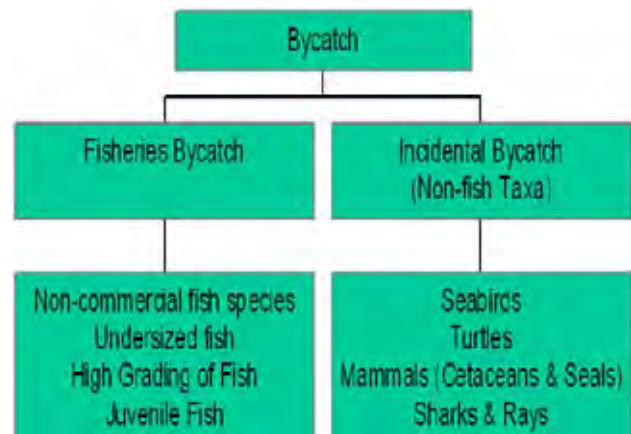


## Introduction

Fisheries can have a range of environmental impacts. Obviously all fisheries are extractive. At worst this means, if poorly managed and monitored, stock collapse can occur. This can be disastrous, not only for the environment but also economically for the industry. Thus the importance of precautionary fisheries management has been widely accepted. Fisheries science deals with the stock assessment of commercial species and, to a lesser extent, the discharge of undersize commercial fish and non-commercial fish species that may be caught through unselective fishing gears. These estimates, and further estimates of occurrences such as “high-grading”, all aim to keep stock at sustainable levels. Management has even been extended beyond national boundaries to the high seas where Regional Fisheries Management Organisations (RFMOs) attempt to regulate effort.

Until relatively recently little consideration had been given to the capture of non-fish taxa by management authorities as this had little direct economic impact. Only recently, with the increasing promotion of an ecosystem approach to fisheries and campaigns such as emphasizing “dolphin friendly” products in the 1990s and more recently for albatrosses and turtles, has attention turned to the significance of fisheries-related mortality on the populations of other taxa (see figure at top right). The species most affected are typically those that are long lived with a low fecundity or sporadic breeding where even a small increase in adult mortality can lead to long term population declines.

Data from the IUCN Red List of threatened species indicate that seabirds are becoming threatened at a faster rate than other groups. Albatrosses, for example, are now the most threatened family of birds with 19 of 21 species classified as threatened by the World Conservation Union (IUCN) according to BirdLife International’s most recent categorizations. Albatrosses may live to over 45 years of age, do not reach reproductive maturity until about 10 years of age, may lay only one egg every other year and form long term breeding pairs. These demographic factors together place them at serious risk to any anthropogenic increase in adult mortality. Similarly, turtles may not breed until over 30 years of age and may only breed every three to eight years. All turtle species are now classified as threatened by the World Conservation Union.



There is a wide range of fisheries techniques and the causes of incidental mortality will differ depending on the fishery and species recorded. The main industrial fisheries may be divided into trawling, longlining and purse-seining/gill-netting; however, within each group there are many sub-divisions. Trawl nets can be demersal (bottom trawling), semi-pelagic, pelagic or pair, all of which have different specification of nets, sweeps and trawl speeds and thus give rise to different interactions. Longlining can be shallow set pelagic, deep-set pelagic, double line bottom (Spanish) or single auto-line bottom and again each gear type can effect different taxa in different ways. Interaction can be exacerbated if the vessel is also discharging processing waste. Whereas comparisons can be drawn between areas, it is still necessary to assess each situation as techniques and species assemblages or even age classes can mean that mortality may be distinct.

## Long-lining

Longlining has received the most attention in recent years. This method became much more popular in the late 1980s as vessels moved away from drift/gill nets to target tuna. In itself longlining is one of the least damaging commercial fishing methods, it does not impact heavily on the seabed and cause benthic damage, is selective (relatively) in both the size and species it catches, meaning that undersize fish are not caught, and does not “ghost fish” (abandoned and lost nets continuing to catch fish and other marine species)— so its greatest environmental impact is in the capture of non-target taxa.

Pelagic longlining consists of hooks hanging from a long drifting line suspended from the surface of the sea by a number of floats. The floats maintain the line near the surface and the length of line con-

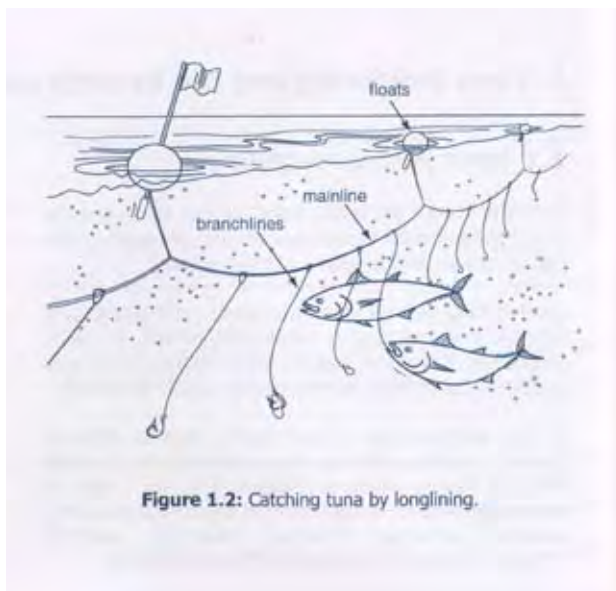


Figure 1.2: Catching tuna by longlining.

necting the floats to the mainline help to determine the fishing depth of the line. The mainline has a number of branch lines or snoods, each with a baited hook. From 300 to 3500 branch lines or hooks may hang along the mainline which extends from 10 to 180 km in length. The shape of the longline and the depth of set will vary depending upon the species that is being targeted. A shallow set, from 35 – 110-m depth would usually target swordfish whilst a deep set 300 – 400m depth would target albacore and bigeye tuna. The lines are usually set and left in the sea for a soak-time of approximately eight hours before being hauled. This is the most common form of longlining in warmer low-latitude fisheries.

Baited hooks are not however just seen as a source of food by fish but also by seabirds, turtles and sharks. Seabirds forage behind boats as the lines are being set and attempt to dive on the baited hooks. In the process they may be caught on the hook and dragged underwater and drowned as the line sinks. This interaction is, however, limited to periods of setting and hauling when the line is within the diving range of seabirds although, given that the line is only lightly weighted, the sink-time of the line behind the vessel can be slow and lead to a large danger area astern.

Turtles may be susceptible throughout the time that the line is in the water and bait is on the hook and are particularly susceptible to capture on shallower set longlines used to target swordfish. In limited observer studies conducted in the Azores 237 turtles were captured in 93 sets. This related to an overall average of 2.5 turtles per set (1.7 turtles / 1000 hooks) or 3.8 turtles per set (2.5 turtles / 1000

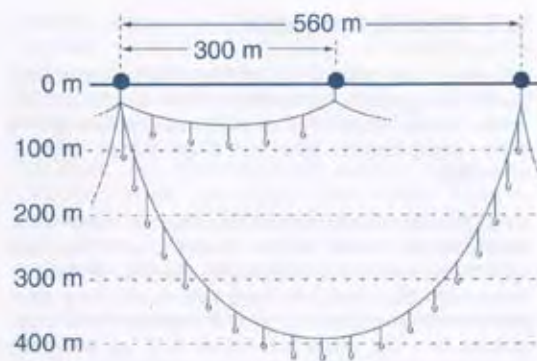


Figure 1.3: The longline can be set shallow or deep depending on the species the fisherman wishes to catch.

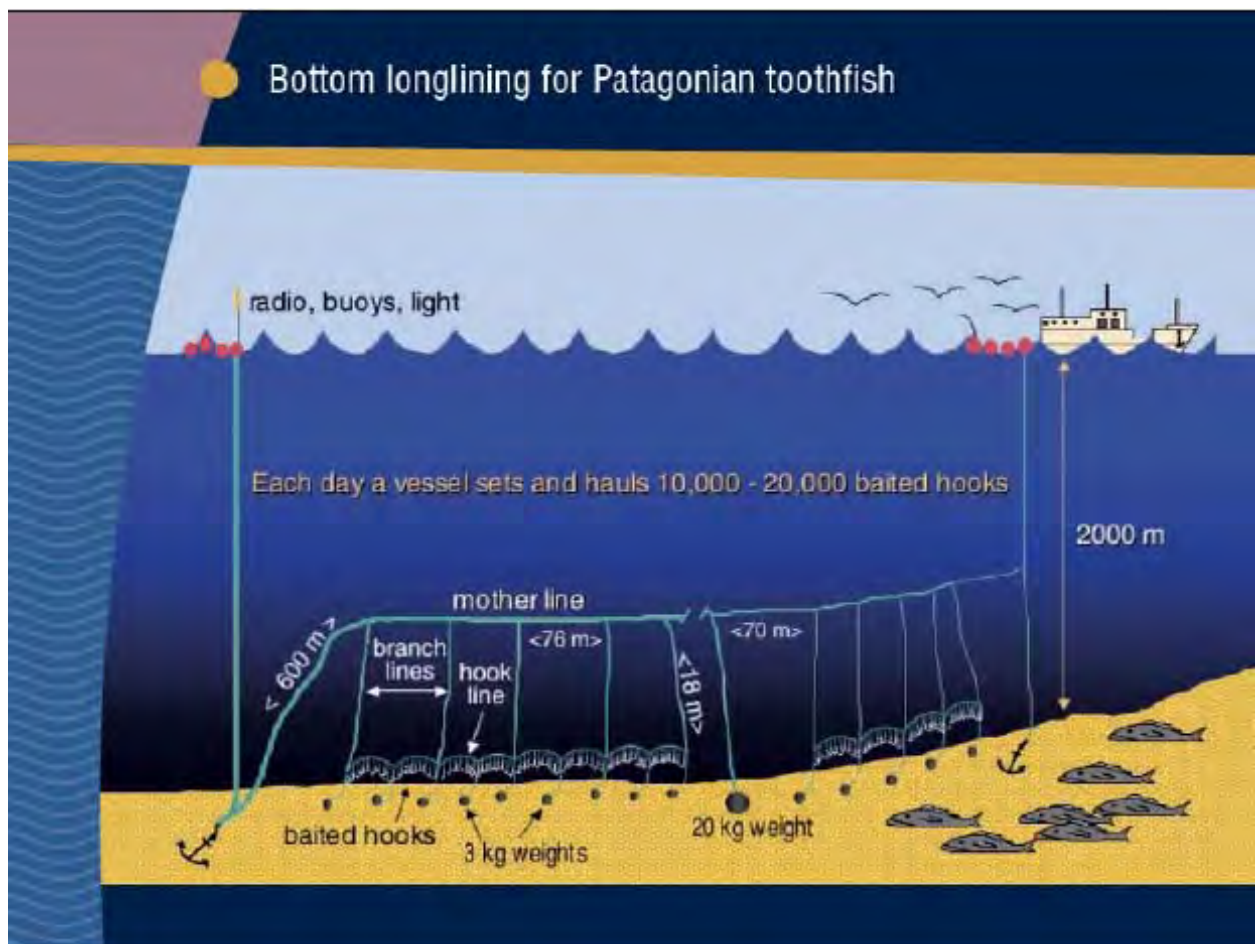
hooks) with turtles present. When considered along with the statistic that under the management of International Convention for the Conservation of Atlantic Tunas (ICCAT) 30 – 40 million hooks are set annually the catch of turtles may be significant.

Sharks are also at risk through the entire operation and may take both bait and the fish caught on the line. Pelagic sharks such as the tiger, blue, silky, oceanic whitetip, thresher, short-finned mako and hammerhead sharks can all interact with oceanic longline fisheries; other coastal shark species may be susceptible to artisanal fisheries. Sharks are susceptible to overfishing as they grow slowly, mature late and produce only a small number of young. There is concern that some species are at unsustainably low numbers.

Bottom-longlining is weighted and set along the seabed with anchor lines at each end leading up to the surface. Lines can be double lines utilising an extra mother line that floats clear of the seabed or single autolines where hooks come directly off the mainline that lies on the seabed. Generally they are set below the feeding depth of seabirds, turtles and sharks and interaction is limited to the periods of setting and hauling when birds can dive on the hooks.

## Trawling

Trawl mortality in relation to seabirds is a relatively newly identified problem and may be as significant as longlining. Mortality can be derived from three sources, collision with the trawl warps,



collision with the net-sonde cable or entanglement or crushing in the net.

Vessels operating in the Exclusive Economic Zone (EEZ) waters and distant from shore generally process fish onboard and thus discharge processing waste such as guts along with unwanted undersize fish and non-commercial fish species. This waste discharge can attract considerable numbers of birds which forage behind the vessel and this is the primary cause of almost all interactions. The birds foraging on waste discharge are then at risk from the trawl warps as they cut through the water. In the Falklands observers recorded one bird contact every minute during periods of waste discharge. Some of these contacts can lead to damage and injury to the bird that may effect its future survival. A proportion are struck by the cable, when their wings become wrapped around it and, with the forward motion of the vessel and the inclination of the cables, are dragged underwater and drowned. A certain proportion of these birds are recovered from wire splices or shackles farther down the cable where they have become lodged. These constitute the confirmed mortalities.

Collision with the net-sonde cable is similar although, as this cable is higher and extends further behind the vessel, there is a greater susceptibility to aerial collision. However, these cables are not now generally used.

Net-related mortality of seabirds is more generally related to midwater pelagic trawls. These trawls are larger and can extend to the size of a football field. Hauling and setting takes longer during which time the net is floating on the water. Whereas bottom nets have a small mesh size, the larger mesh size of pelagic nets allows seabirds to dive through the net to scavenge fish stuck in the mesh. These birds can then become trapped and drown or alternatively be crushed as the meshes open and close under tension.

### By-catch impact assessment

A preliminary review of the range of bycatch species and the level of bycatch within United Kingdom Overseas Territories and Crown Dependencies was conducted by correspondence with governments and relevant NGOs, and by consulting published and unpublished literature. However, from





### **Trawl Warp Cable Strikes**

1 contact / minute  
during periods of offal  
discharge & processing

1500 confirmed  
mortalities p.a. in FI



in an unregulated and unreported manner or if there is no ability to monitor the zone. There are instances known and suspected both in the Overseas Territories of Tristan da Cunha and Ascension in the South Atlantic where unregulated fishing has occurred.

### **Is this fishery managed?**

This will provide basic data. What fish species are targeted may suggest what interaction is occurring and confers obligations on the authority for sustainable management of all components of the fishery.

the few responses received it would seem probable that data are lacking in many areas.

A format to address the issue of the incidental catch of seabirds in longline fisheries has been established through the Food and Agriculture Organization of the United Nations' (FAO) *International Plan of Action - Seabirds*. This was initiated in 1997 through the FAO Committee on Fisheries (COFI) and adopted in 1999, and follows such initiatives as the *FAO Code of Conduct for Responsible Fisheries*. The established system is a two-stage process. In the first stage a risk assessment is conducted to determine the extent and nature of a nation's incidental catch of seabirds. If this shows that there may be a potential problem or that data are deficient, a second stage is to commission a National Plan of Action to address problem areas, be this establishing observer protocols to better determine the level of the problem or instigating the adoption of mitigation procedures.

It is obviously impossible to generalise as fisheries and seabird assemblages differ widely. However, some general issues to consider may be:

### **Is there an established EEZ or fishery and/or does unregulated fishing occur?**

The fact that there is no established fishery does not mean that bycatch is not occurring if vessels are using the zone

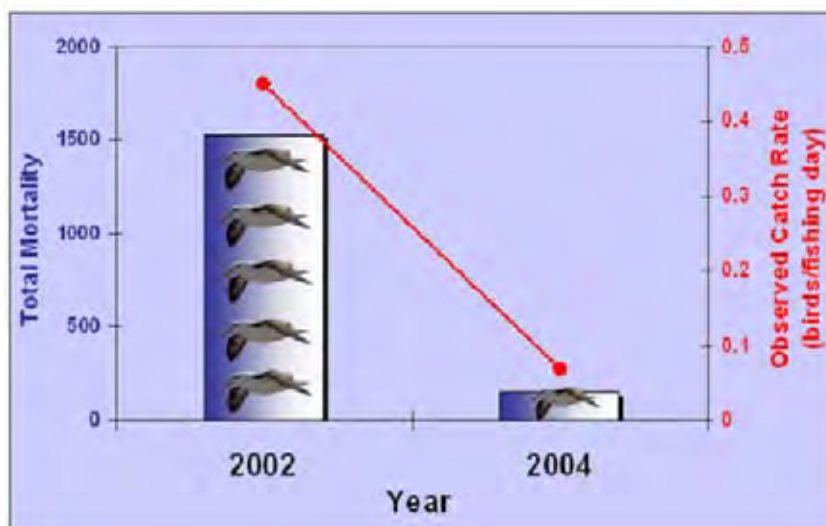
### **Is the fishery monitored and how? (patrol vessels, in-port inspections, at-sea observers, catch returns, etc.)**

How the fishery is monitored will determine the accuracy of available data, whether bycatch is reported and how additional data may be obtained.

### **Are catches landed in a UK Overseas Territory or do international vessels discharge elsewhere?**

This may preclude the verification of catches and





liaison with the fisheries, or even the placing of observers aboard.

### **Has an assessment of incidental mortality been conducted?**

It is important to know the basis of the assessment as voluntary reporting has proved to be very unreliable in the past.

### **What species assemblages are present and what species have been identified at risk?**

The biology, distribution diet and diving ability of species can all suggest if they may interact with fisheries.

### **Is the biological range of species known and have these been analysed in terms of spatial and temporal overlap with fisheries?**

BirdLife International has co-ordinated the pooling of satellite tracking data from many albatross studies. This initiative can be used to determine the potential for where and when interaction can occur by overlaying fishing effort on species distribution.

### **Have bycatch rates or annual mortality been quantified?**

Whereas the most important first step is to quantify the problem, ongoing monitoring is also essential if mitigation is to be adopted.

In addition to the voluntary IPOA-Seabirds, the International Agreement on the Conservation of Albatrosses and Petrels (ACAP, [www.acap.aq](http://www.acap.aq)) is a binding agreement that addresses all issues concerning the conservation of albatrosses. This

Agreement was ratified in 2004 and incurs certain obligations on signatories, which may be range states or the flag states of vessels, to monitor, conserve and reduce threats both at sea and ashore.

This agreement was made under the auspices of the Convention on Migratory Species (CMS). The CMS is also applicable to turtles and to some other oceanic species, including fish and mammals that cross international frontiers. However, although a number of regional agreements have been negotiated, such as the Memorandum of Understanding (MOU) on the Conservation Measures for the Marine Turtles of the Atlantic Coast of Africa, MOU on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia. There is however as yet no global agreement such as ACAP for turtles (or for that matter, sharks), although CMS itself obliges Contracting Parties to give some protection, in theory at least.

In order to assess correctly the impact of fisheries it is necessary to obtain impartial and dedicated observer coverage understanding the nature of the problem. Voluntary recording by the vessels is highly unreliable, either due to deliberate misreporting or through the fact that no one person onboard is specifically tasked to record such occurrences. Catches are usually back-calculated from processed catch, and no accurate record of bycatch either fish or other is generally recorded. Similarly, seabird interaction with the trawl warps is not visible from the bridge of the vessels, or even the trawl deck in many cases, and may not be noticed.

In Tristan da Cunha in the 2003/04 longline season, 13 Great Shearwaters were recorded killed in 2.08 million hooks (0.006 birds/1000 hooks) from fisheries logbooks. However, two observer trips covering 1.09 million hooks recorded 655 birds or 0.601 birds/1000 hooks – a hundred times more than had been recorded by the fleet voluntarily!

Fisheries observers are tasked with recording fisheries data for stock management and are required to spend the majority of their time in the factory and cannot therefore record bycatch interactions accurately – although a reduced observer protocol is better than no data. In the Falklands the finfish and squid fisheries were established 20 years ago,

although not until the last three years were dedicated observers placed on trawlers, since when no seabird mortality has been recorded. The story is not all “doom and gloom”; there have been significant steps forward in some areas with dramatic declines in mortality rates where assessment has taken place and mitigation been adopted. Some of the most notable have been in relation to the reduction of albatross mortalities in the south-west Atlantic.

The Falkland Islands are the world stronghold of the black-browed albatross, with approximately 65% of the world population or 371 000 breeding pairs. However, populations have been declining at 1% a year and in five years the population has decreased by 19,000 pairs. As a result of such declines the species has been categorized as Endangered by IUCN. Satellite tracking has shown that, whereas juveniles and non-breeding adults utilise the whole of the Patagonian Shelf as far north as Brazil, during the breeding cycle adults are almost wholly confined to Falkland Island waters, so whereas international initiatives are required to address the whole problem, advances in the Falklands can also result in positive outcomes.

The problem of longline mortality has been recognised since the inception of the Falklands commercial fishery in 1994, with mitigation first being investigated the next year. It was not until 2000 that an independent assessment was made by dedicated seabird observers, initially by Falklands Conservation and then by the Falkland Islands Government (FIG). The FIG programme is continuing and this ongoing monitoring has ensured that mortality has continued to fall. Mortality has fallen a 100-fold from when the fishery was established and four-fold since independent monitoring commenced, as highlighted below.

Incidental Mortality in the Falklands longline fishery:

Year	Albatross Mortality / 1000 Hooks
1995 Summer	0.53
1995 Winter	0.13
2000/01	0.02 (134 birds)
2001/02	0.011 (80 birds)
2002/03	0.005 (45 birds)

At-sea observations on-board trawl fishing vessels at sea commenced the following year (2002/03) and highlighted a problem of seabird mortality in the trawl fishery. Black-browed albatrosses attract-

ed to the vessels through the discharge of onboard processing waste are struck by the trawl warps as they foraged behind the vessels. Some birds are caught by the wing and dragged underwater and drowned. A proportion of these are recovered onboard at hauling and count as a confirmed mortality. An unidentified number may be lost from the warp or may be struck on the surface to float free. Over 750 hours were spent observing trawl operations and yielded an estimate a trawl related mortality of 1500 Black-browed albatrosses a year.

## Management and mitigation

During 2003/04 trials were conducted of a variety of mitigation measures. A simple bird-scaring line towed behind the vessel (costing under UK£100) was shown to be the most effective measure and reduced bird collisions from one bird strike/minute to one bird strike/hour during periods of offal discharge. The success of these lines in trials led to the lines being made obligatory under licence conditions across the Falklands finfish fleet from July 2004. At-sea observations since then to monitor the success of the fleet-wide adoption has shown a 90% reduction in confirmed seabird mortality to 169 birds a year across the finfish fleet

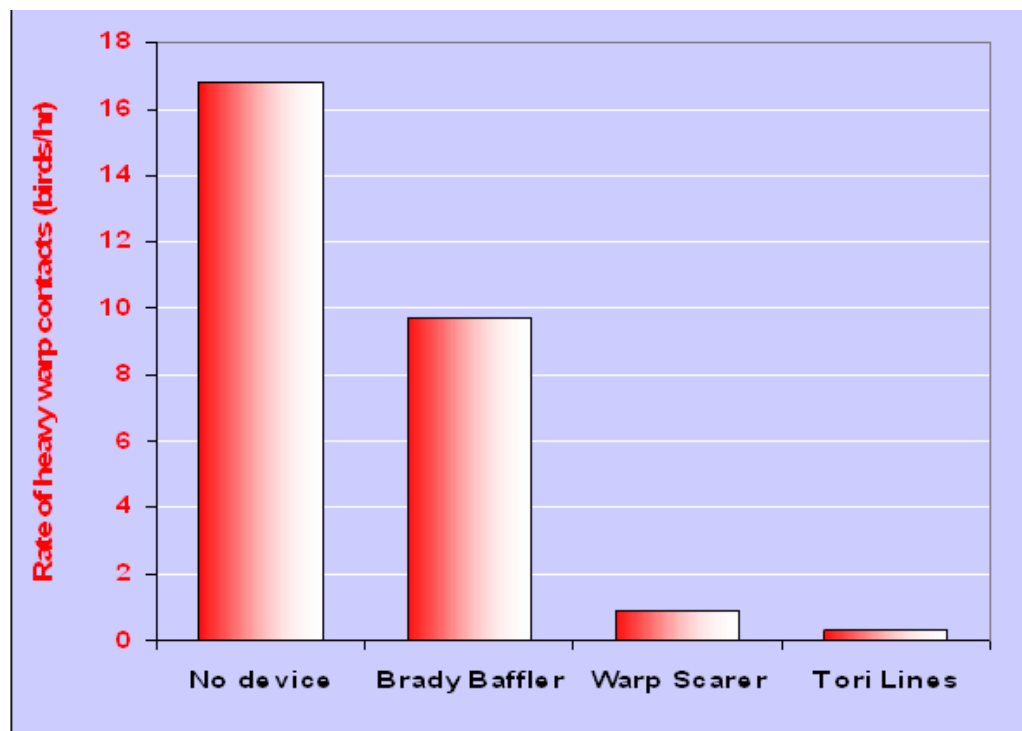
During this time Falklands Conservation was contracted by the UK’s Royal Society for the Protection of Birds to formulate a National Plan of Action - Seabirds. Separate plans of action were prepared for the longline fishery, trawl fishery and jig fishery and, following an 18-month consultation phase with the fishing industry, these plans were adopted by FIG Executive Council in March 2004. The Falkland Islands thus became the first UK Overseas Territory to have adopted action plans for all forms of fishing conducted within its waters. This coincided with the United Kingdom’s adoption of ACAP in March 2004.

Arguably the best example of a managed fishery adopting a suite of mitigation measures is exemplified by the Convention for the Conservation of the Antarctic Marine Living Resources (CCAMLR) and the proactive stance of the Government of South Georgia and the South Sandwich Islands. South Georgia is of critical importance for a number of albatross species, including wandering, black-browed and grey-headed. All species are in decline with wandering albatross currently decreasing at 4.5% a year.

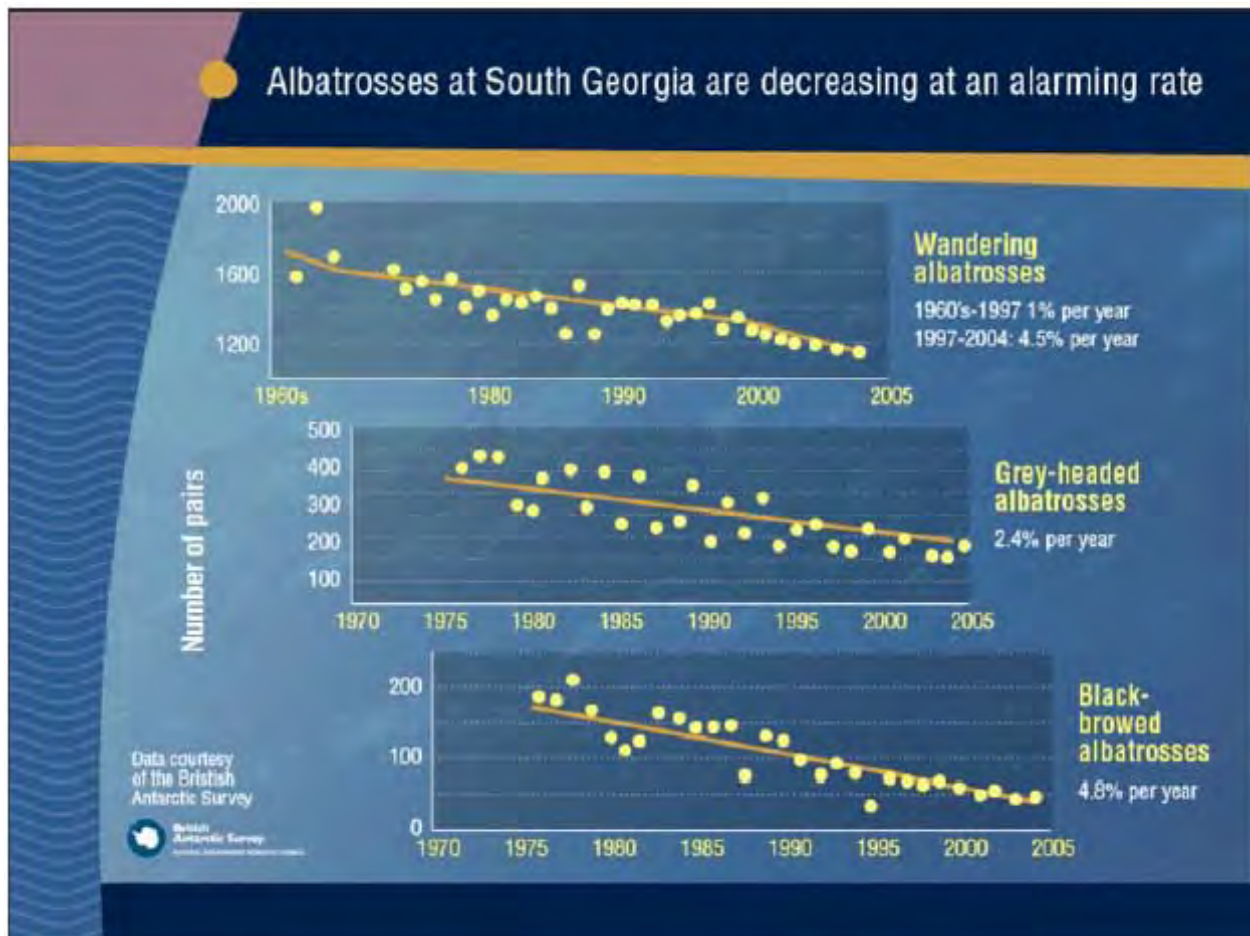
Seabird mortality in the legal fishery around South



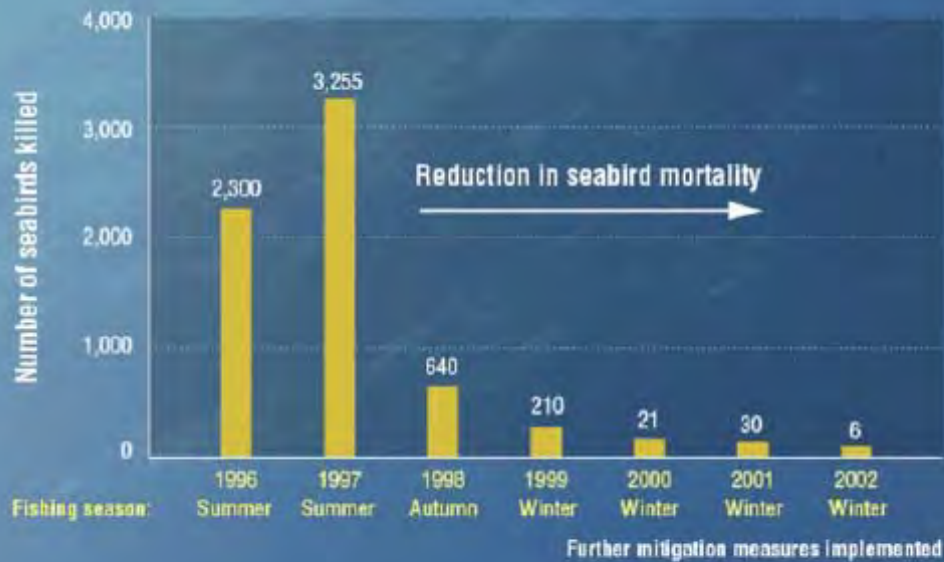
Georgia has now been reduced to negligible levels. This has been achieved largely by the development of a specialist group tasked with identifying an appropriate suite of measures to mitigate seabird mortality along with the commitment of the South Georgia Government to implement CCAMLR directives, and at times to apply its own regulations in addition. The CCAMLR Working Group on Incidental Mortality arising from Fishing (WG-IMAF) was established in 1993 and mortality has been reduced from 0.66 birds/1000 hooks in 1993 to 0.0003 birds/1000 hooks in 2003, which represented an annual



bycatch of only eight birds by the South Georgia longline fishery. Positive results followed quickly once fishing crews became accustomed to the new mitigation measures. In the first year of adoption, mortality dropped 10-fold from almost 6000 birds a year to 640 birds pa and then dropped to 210,



● **2 Governments** – South Georgia Government regulated change from summer to winter fishing



● **2 Governments** – South Georgia Government regulated change from summer to winter fishing



and finally to 21 or less birds a year in subsequent years.

However, this success has been achieved only through patrolling to exclude unregulated fishing and strict enforcement through an observer programme, port inspections and at-sea boardings from fishery-patrol vessels. These activities require considerable investments and resources, that may not always be available in other areas. The issue of seabird mortality in Illegal Unreported and Unregulated (IUU) fisheries is still to be adequately addressed in Tristan waters as, without an all-weather port or an ocean-going fishery-patrol vessel or even reliable telecommunications, it is not possible accurately to monitor fishing activities. The island group is critical for many species including the endemic Tristan albatross, Atlantic yellow-nosed albatross and spectacled petrel. Additionally, two thirds of the world population of sooty albatrosses breed on the islands. Much work has been conducted on terrestrial conservation, management plans and up-grading of legislation from within the Tristan islands but, with limited resources, the protection of the marine environment will be difficult without strong commitment and assistance from external sources.



## Review 2: Development issues in the inshore marine zones of UK Overseas Territories and Crown Dependencies

Dr Annie Glasspool, Bermuda Zoological Society



Glasspool, A.F. 2007. Development issues in the inshore marine zones of UK Overseas Territories and Crown Dependencies. pp 122-133 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

This paper gives a synopsis of the development issues impacting the inshore marine zones of the UK's Overseas Territories and Crown Dependencies, discusses the main trends driving these development issues, considers mitigating factors and presents some of the management actions being taken in various jurisdictions, with a view to stimulating a wider discussion on the subject.

In considering the broad suite of development issues faced by the UK Overseas Territories and Crown Dependencies it is readily apparent that geography has been an underlying factor. Whilst all but two of the jurisdictions (Gibraltar and BAT) share a level of isolation from continental land masses, it is recognised that those in the most remote, and/or physically challenging locations, immediately surrounded by deep ocean and therefore good flushing regimes, have generally been less impacted by development issues (these include the Southern Atlantic territories as well as Pitcairn in the Pacific). In contrast, tropical and sub-tropical Caribbean and Western Atlantic jurisdictions, as well as Jersey, Guernsey, and Gibraltar enjoy pleasant climates and generally safe shallow anchorages within enclosed lagoons or clearly defined harbours and bays which have lower flushing rates. Coupled with abundant (at least historically) and readily accessible natural resources they have therefore always supported much higher population densities and development potential. (BIOT, is an exception, largely protected from development through its isolation).

Across, and within these geographical regions, the emergent marine environmental issues have resulted from a fairly common progressive trend of economic development, which can broadly be described in three phases. Phase 1) is natural resource harvesting; common to some extent in all jurisdictions (except BAT), but in many over-harvesting has decimated local biodiversity, disrupted food chains, impacted water quality, and provided a potential opening for unwelcome introductions. Phase 2) is trade and farming; again practiced in most of the jurisdictions, trade has triggered increased traffic and population influxes with their attendant needs for ameni-



ties. The issues faced include degradation of marine habitats for the construction of larger ports or mariculture activities, dredging of channels for shipping, and increased sewage and solid waste, whilst farming poses run-off issues. Finally, (phase 3)) some jurisdictions are undergoing, or have undergone a metamorphosis into almost exclusively service-based economies (primarily tourism, and now emerging international business). Associated impacts include habitat destruction, loss of biodiversity, loss of water quality and ecological imbalance from the following; hardscaping/destruction of coastal habitats for houses, hotels, docks, moorings, marinas and the associated changes in flushing regimes, increased run-off, sewage, solid waste disposal, light pollution, boating traffic (including cruise ships) leading to noise pollution, groundings, direct collisions with marine life, oil pollution, toxic impacts of anti-fouling paints and wildlife harassment. (Given their impacts, it is perhaps ironic that a primary driving factor behind the emergence of these activities has been the natural beauty and biodiversity richness of the territories!). It is worth noting that most of the Overseas Territories and Crown Dependencies have escaped the impacts of heavy industry although oil exploration is underway in the Falklands. However, a number of jurisdictions have served as strategic military outposts with associated activities causing impacts associated with land reclamation, pollution, waste disposal and noise and light pollution. All jurisdictions face threats from global climate change.

Current management approaches vary significantly, and resource limitations are apparent. The availability of information on development impacts for the various jurisdictions varies according to the amount of research undertaken. This in turn is directly correlated with the level of development and its threats, but is not surprisingly inversely related to the pristine status of a particular jurisdiction's biodiversity! Various international treaties and conventions, coupled with local legislation provide some framework for management directed at specific issues within the territories, but this is often tackled in a piecemeal fashion, development by development. An overarching vision for the forward development of the inshore marine zones of each Overseas Territory and Crown Dependency seems to be critical.

**Dr A.F. Glasspool**, Bermuda Zoological Society, P.O. Box FL 145, Flatts, FL BX, Bermuda. [afglasspool@gov.bm](mailto:afglasspool@gov.bm)

## Background

Given the broad geographical distribution of the UK Overseas Territories and Crown Dependencies, it is not surprising that their shallow inshore waters support a rich diversity of life. From the exotic islands of the Caribbean to the isolated oceanic volcanic seamounts of the western and southern Atlantic and Pacific, or from the vast shallow water reef system of BIOT to the largely ice-covered British Antarctic Territory, these jurisdictions represent examples of some of the most extreme environments, supporting a broad range of habitats and some of the world's rarest and most threatened marine species. For example, almost all species of marine turtle, a flagship group in a number of territories are represented and Green turtles nest on Ascension, Pitcairn, Cyprus Sovereign Base and several of the Caribbean UKOTs (1). Marine mammals, another flagship group, are also found throughout the UKOTs and CDs and species include the endangered Sei, Fin, Blue and Northern Right Whales. BIOT alone boasts 1.4% of the world's coral reefs;

coupled with the reefs of the Caribbean, Bermuda and Pitcairn, the UKOTs boast some of the most productive inshore waters in the world, whilst the shallow water fish and corals inhabiting them are recognised biodiversity hotspots (1). Add to these a wealth of other invertebrates, including a suite of lesser known but critically endangered marine cave dwelling crustaceans and the marine biodiversity of the UKOTs and CDs represents a significant proportion of the UK's overall biodiversity.







However, almost without exception these diverse environments are facing increasing threats from human activities. Land reclamation, habitat destruction and hardscaping, over-harvesting, sewage, pollutants, litter and solid waste, introduced species, noise, light and sonar pollution, wildlife harassment, mineral and oil exploration and global climate change are proving to be increasingly persistent threats. Add to this the fact that nearly all these jurisdictions are now economically dependent on the continued health of these natural resources, and resource managers are faced with a daunting task. We should also not forget the cultural and built heritage, notably ship wrecks, which present an interesting study, on the one hand signalling human impact on the other a part of our heritage we seek to protect from further impact.

In considering the broad suite of threats facing the UKOTs and CDs, it is also readily apparent that geography has been an underlying factor shaping the development issues faced in the territories. Whilst all but two (Gibraltar and BAT) share a level of isolation from continental land masses, it is recognised that those in the less accessible and/or physically challenging locations have generally been less impacted by development issues. Those which are also immediately surrounded by deep oceanic waters and good flushing regimes which help to dilute the impacts of pollution events and sedimentation have also fared better. These include the Southern Atlantic territories as well as Pitcairn in the Pacific, ie: south of the Equator.

In contrast, tropical and sub-tropical Caribbean and Western Atlantic jurisdictions, as well as Jersey, Guernsey, and the Channel Islands, the Isle of Man and Gibraltar enjoy pleasant climates and generally safe shallow anchorages within enclosed lagoons or clearly defined harbours and bays. Not surprisingly these jurisdictions have been heavily colonized. Coupled with abundant (at least historically) and readily accessible natural resources these are now some of the most densely populated territories on earth with population densities as high as 1,182



Fig. 1. Diagram to show the main regional groupings of the UK Overseas Territories and Crown Dependencies (adapted from the "Breath of Fresh Air" Resource materials).



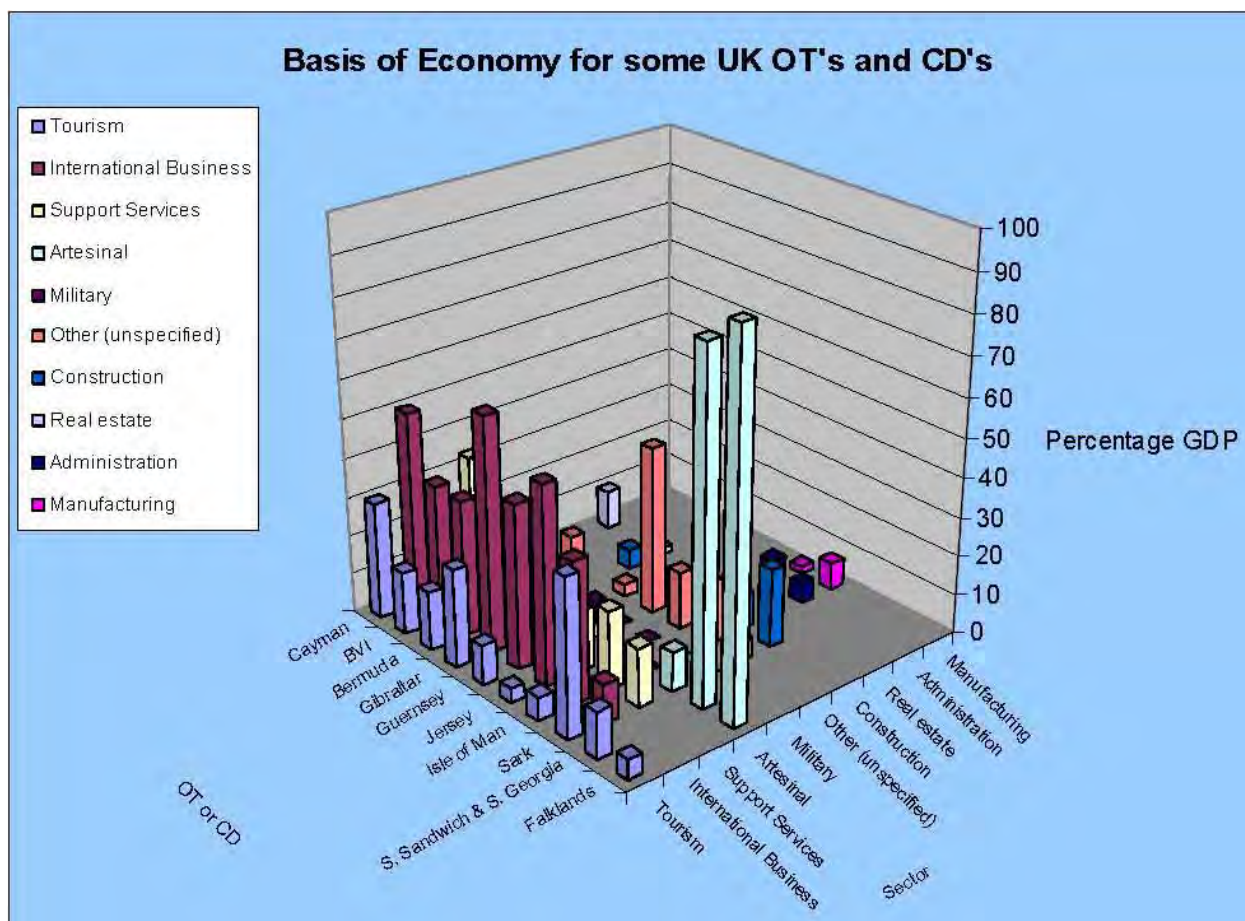


Fig.2. The extent to which service-based industries support the economies of the northern latitude territories.

people per km<sup>2</sup> (Bermuda)(2). With inshore waters surrounded by shallow shelves which have lower flushing rates, the effects of over-population are significantly compounded particularly with regards to pollution, run-off and sedimentation. (NB. BIOT

is an exception, largely protected from development through its extreme isolation).

It follows that across, and also to some extent within these geographical regions (notably the Car-

UK OT or CD	Over-harvesting	Coastal development	Land reclamation	Run-off	Oil Pollution	Sewage waste disposal	Dredging/ Mooring/ anchors	Cruise ships	boat traffic	Mariculture	Ecotourism	Noise pollution	Light pollution	Solar pollution	Invasive species	runing rates	Lack of awareness	Litter	Lack of polit
Bermuda	1	0	0	2	2	3	3	3	3	3	0	1	1	0	?	1	2	3	3
British Virgin Islands	0	0	0	0	4	4	3	0	1	3	2	1	1	3	1	2	0	4	
Cayman Islands	0	0	0	0	1	3	2	0	1	3	2	1	2	1	1	?	1	3	4
Turks and Caicos	2	0	0	0	1	5	5	0	3	2	0	1	0	0	0	2	0	1	
Gibraltar	0	0	0	0	0	1	1	0	3	2	3	0	0	0	?	0	2		
Guernsey	4	1	1	1	1	1	1	0	0	0	2	1	0	0	1	1	3	0	3
Isle of Man	4	3	1	1	2	5	1	0	0	3	0	1	3	?	3	2	0	?	
Jersey	2	3	0	0	1	3	3	2	2	1	3	0	1	1	1	1	3	1	3
Sark	3	2	0	0	0	1	3	2	0	1	2	0	1	2	2	0	2	0	
Cyprus Sovereign Base	2	0	0	2	1	3	0	0	0	0	1	0	0	0	0	0	0	0	
Ascension	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2	
Falklands	3	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	5	
South Georgia	5	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	1	
South Sandwich Islands	5	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	1	
St. Helena	0	1	1	1	1	5	2-3	5	1	1-4	1	0	1	1	1	0	1	0	2-3
The Tristan da Cunha Islands	3	0	0	0	2	1	0	0	0	0	0	0	0	2	0	0	0	0	
British Antarctic Territory	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	
The Pitcairn Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
British Indian Ocean Territory	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Table 1. Results of questionnaire sent to all UKOTs and CDs identifying threats to their inshore marine zones

ibbean territories) the emergent marine environmental issues have resulted from a fairly common progressive trend of economic development, from colonisation and natural resource exploitation, through to trade and farming, and on to the service-based industries currently driving the economies of the majority of the northern latitude territories as illustrated in Fig. 2.

## Discussion of the Threats

If we follow this theme and consider development through a phased approach we can consider the historical and current issues being faced by the territories and the solutions being applied. As a basis for this discussion, a questionnaire was circulated to all the UK Overseas Territories and Crown Dependencies seeking input on the threats to their inshore waters, with a request to try and rank these. *This ranking was undertaken relative to the threats within each territory; no effort was made to compare the threat level between territories.* The ranking scale used was 0 – 5 with 0 representing no threat and 5 representing a serious threat. No effort is made to distinguish between historical and current threats; current management practices in some territories may have alleviated the threat, but the impact may still be felt.

### Phase 1: Natural Resource Exploitation

Early colonisation of the UKOTs and CDs was usually driven by the plentiful supply of exploitable resources. In Bermuda for example the literature tells of “fish so abundant that if a man steppe



Photo 1. Conch harvesting in Cayman

*into the water, they will come around him: so that men were faine to get out for fear of byting”, and “great plenty whales which I conceive are very easie to bee killed, for they come so usually and ordinarily to the shore, that wee heard them oftentimes in the night abed” (3).* This



Photo 2. Accidental turtle capture in fishing net in Bermuda

abundant supply of natural resources probably applied for most of the territories and was enough of a trigger to encourage ongoing settlement in many. Inevitably though, this resulted in a sweeping depletion of these resources, and in many territories this is still an ongoing threat.

Table 1 shows that over-harvesting is considered to be especially problematic in some of the Caribbean territories (notably Cayman and the British Virgin Islands), as well as Bermuda, South Georgia and South Sandwich Islands, Gibraltar, Guernsey and the Isle of Man. It is in the tropical and subtropical jurisdictions where overharvesting has the largest impact on the inshore waters (as opposed to open ocean fisheries) and both commercial and subsistence level fishing on the shallow coral reefs has targeted a broad suite of taxonomic groups, including marine turtles, shellfish such as Queen conch *Strombus gigas*, and many of the larger grouper species, driving many to local extirpation and resulting in ‘knock-on’ impacts to the whole ecosystem; for example the depletion of algae-eating parrotfish can lead to the general demise of the reef by allowing the algae to flourish and “suffocate” the corals. This has been most dramatically seen in Jamaica, where 94% of the coral reef has died, but smaller scale examples likely exist within the UKOTs. As the reef forms the main physical barrier protecting these islands from storms and hurricanes, as well as being pivotal to local economies for tourism activities and food, any knock-on effect can have serious ramifications for the territories.

### Solutions:

Most jurisdictions have tackled over-harvesting through a mixed approach of enforcement and public awareness. Restrictions on fishing range from complete protection of a species (for example



marine turtles in most territories) to the establishment of a protected areas system, which may be year round or seasonal during the breeding season. Restricted gear types, bag limits and catch size limits are also in place in most territories for species of concern, whilst licensing of commercial fishermen for certain species and/or gear types, offers the greatest ability to effectively monitor and manage the resources. In Bermuda, the taking of marine turtles below a certain size was prohibited as far back as 1620, although interestingly, this legislation failed through lack of information; unbeknownst at the time, the small turtles being protected did not represent Bermuda's breeding population but rather the juveniles of other populations, whilst the adult turtles which continued to be exploited were Bermuda's breeding population, and were extirpated as a result. This is a classic illustration of the need for informed management!

Public awareness campaigns may also help minimise illegal exploitation by promoting awareness of the penalties for illegal take, however increasingly some territories are noting problems with the expatriate workforce who often fail to familiarise themselves with the local fisheries legislation, and may struggle with language barriers. A lack of resources is a problem in enforcing fisheries regulations in virtually all of the territories.

Other more hands-on solutions for tackling the depletion of local fisheries resources include the implementation of recovery plans, which may include the establishment of hatcheries or grow out facilities targeting threatened and endangered species, eg. Ormers in Jersey; turtles in Cayman; scallops in Bermuda.

International treaties are in place in certain juris-

dictions which provide for consideration of the impact of the whole food chain. In Antarctica, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) adopts an ecosystem approach such that commercial fishing must take into account not only the impact on the target species, but also the impact on predator or prey species. More general treaties and charters in place in many of the territories which call for the protection of threatened species and/or habitats including marine include the Environment Charter, Convention on Biological Diversity, Ramsar Convention, Convention for the Conservation of Antarctic Seals, Convention on the International Trade of Endangered Species, The Bonn Convention, the International Convention on Whaling, The Convention concerning the protection of the World Cultural and Natural Heritage.

## Phase II: Trade and Farming

Once successfully colonized, farming became a mainstay and most of the territories established themselves as active trading stations. This development phase has had numerous and far reaching impacts on the shallow water marine zones, most notably (but not exclusively) from the increased shipping. These include:

**Habitat Destruction** – The challenges of navigating the often complex reef systems surrounding many of the UKOTs and Crown Dependencies are evidenced from the numerous ship groundings that have occurred. Now often considered important from a cultural and tourism perspective, many of these wrecks have left a permanent scar on the reef. For example, the vulnerability of Bermuda's coral reef



*Photo 3 & 4. A ship sits on the reef in Bermuda whilst the inset photo shows the total destructive force of such a grounding on the living corals.*



system was dramatically demonstrated in 1984, with the grounding of the fully laden super tanker *Aguila Azteca* on the reefs to the north of Bermuda. Carrying 196,000 tons of heavy Maya crude oil, this tanker could easily have created the largest oil spill in history, were it not for the unseasonably mild weather. However, it is not only the ships themselves, which damage the reefs when grounding but also the blasting that is often employed to salvage them. About 70 ha (173 acres) of shallow outer reef (less than 10 m (33 ft) in depth) have been severely disturbed by groundings in Bermuda, representing about 1% of that reef zone. Long-term monitoring of the *Mari Boeing* grounding scar, created in 1978, has shown that recovery of the reef is very slow, on the order of 100 years or more (4). Better navigational aids are the most widespread solution to accidental groundings. In Bermuda, the Government petitioned the International Maritime Organisation to declare a 30 mile “Area to be Avoided” by all commercial shipping not calling in to the Island. Additionally, the Government invested in RACON (active radar responding) beacons on the fringing reef to mark navigational hazards.

In addition to groundings, the need for port facilities to be expanded in all jurisdictions to accommodate the increased shipping activity has necessitated significant dredging and modification of the shoreline and shallow waters, resulting in habitat loss. Dredging is listed as a significant threat in all the Caribbean UKOTs as well as the Isle of Man and St Helena.

**Increased sedimentation, runoff** – In an effort to prevent further groundings, navigational channels crisscross the shallow waters of many of the UKOTs and CDs. Whilst reducing the impact of the groundings, the dredging of such channels has itself resulted in significant habitat destruction, as well as contributing to the sediment loading on the reef. Although the impact of the dredging may be only temporary, the continual movement of ships through these channels creates often constant sediment loading of water on the adjacent reefs. 33% of Caribbean coral reefs are threatened by sedimentation (5), which smothers the corals preventing the light needed for photosynthesis from penetrating. Increased sedimentation may also result from agricultural run-off and soil erosion, which may contribute pollutants in the form of pesticides and cause eutrophication of the inshore waters. Cayman and British Virgin Islands both cite run-off as a significant threat, whilst in Jersey, there is concern about eutrophication resulting

from pig farms in nearby France, as well as local potato farming. Aquaculture too has had a significant impact in many of the territories and Cayman has implemented an Aquaculture Development Policy to regulate activities. Licensing of dredging activities is also practiced in several territories.

**Oil and other pollutant** - Oil pollution is a daily threat with shipping activity, and is noted as being a significant threat in Gibraltar, Sark and the British Virgin Islands. Oil “fingerprinting” techniques have been successfully employed to trace offenders, whilst oil spill contingency programmes can be activated to contain the spread of oil. Public awareness campaigns to encourage marine service stations and the boating public to adopt more careful fuelling practice have also been tried in some jurisdictions, whilst the Convention on the Prevention of Marine Pollution from Ships had a noticeable effect on reducing contaminant spills across the globe.

Metal-based anti-fouling paints used on boat bottoms are one of the main sources of metal contamination in the marine environment. Many of these paints contain TBT (Tri-butyl tin) which is highly effective as an anti-fouling agent. It has been linked to “imposex” in gastropods, in which the female develops a penis and becomes infertile. There is evidence of imposex in older Harbour Conch in Bermuda (2) although the cause has not been definitely attributed to TBT. This condition may pre-date the local ban on the importation and use of TBT-based paints in 1988. However, TBT is still used on cruise ships and most large ships. Concentrations of TBT in Bermuda’s inshore waters are



Photo 5. Female Harbour Conch in Bermuda exhibiting imposex

still elevated despite the ban of anti-fouling paints and additives, as paint chips scraped off boats are often washed into the water and become buried in the sediment. TBT is still widely used in the British Virgin Islands because of concerns about the impact of invasive species on the marine environment.

**Ballast water (Invasive species)** - Ballast water from visiting ships presents a potential problem in that it provides an avenue for the introduction of invasive alien species (IAS). For many territories, however, ships come laden with goods and then only take on ballast water when they are leaving, having off-loaded their cargo, so that the threat is minimal. Solutions to the inadvertent introduction of IASs through ballast water include restricting dumping of ballast water, public awareness and control/eradication of the invasive species (the most challenging option in the marine environment). However, IAS have shown up; *Sargassum mutans* is a problem in Jersey, whilst the Pacific Lionfish *Pterois volitans* is now resident in Bermuda, its ecological impact as yet unknown. Both the British Virgin Islands and Gibraltar note IAS as presenting a significant threat, whilst they are of concern in the Channel Islands, Isle of Man and Sark

### Phase III: Service-based Industries

A number of the UK Overseas Territories and Crown Dependencies jurisdictions are undergoing, or have undergone a metamorphosis into almost exclusively service-based economies (primarily tourism, and now emerging international business). Associated impacts include habitat destruction, loss of biodiversity, loss of water quality and ecological imbalance from the following; hard-scaping/destruction of coastal habitats for houses, hotels, docks, moorings, marinas and the associated changes in flushing regimes, increased run-off, sewage, solid waste disposal, light pollution, boating traffic (including cruise ships) leading to noise pollution, groundings, direct collisions with marine life, oil pollution, toxic impacts of anti-fouling paints and wildlife harassment. Some examples are discussed below.

#### Coastal Development and land reclamation –

Coastal development presents one of the most serious threats to the inshore waters of the UKOTs and Crown Dependencies, fuelled by growing tourism and the development of international business. In



Photo 6. Land reclamation underway in Jersey

Jersey, one of Europe's largest land reclamation schemes using recycled glass occurred adjacent to a Ramsar site in 1995 – destroying one of the Island's most diverse reefs. Meanwhile, the Isle of Man is currently faced with the challenge of a land reclamation scheme for their new airport development. In Bermuda the construction of the Air Force Base (the present-day airport) during the 1940s necessitated extensive dredging and land reclamation in Castle Harbour. The construction required the bulldozing of a dozen islands and the dredging of sediments and near shore coral reefs to generate landfill. In all, approximately 24.4 ha of coral reef, 18.2 ha of seagrass beds and 5.7 ha of mangrove habitats were destroyed; the fine silt material that spread over the entirety of St. George's and Castle Harbours choked the coral, permanently altering the marine environment. The new land restricted tidal flow and was insufficient in removing the silt that remains trapped and continually re-suspends to this day (4). The popularity of marinas is also increasing in those jurisdictions catering to service-based industries; whilst these minimise the destructive impacts of moorings (especially on seagrasses where they carve 'halos' into the grass beds) and anchors on both seagrasses and coral reefs, their construction and ongoing operation can be detrimental, particularly as important nursery habitats are typically to be found in the sheltered bays around the shoreline which lend themselves to marinas. Planning zonings are designed to control development activities, and most jurisdictions call for Environmental Impact Assessments on large scale projects (although in many, approval often effectively precedes the EIA). Land reclamation is also recognized as a significant threat in the British Virgin Islands, Cayman, Gibraltar and Guernsey.



*Photo 7. Dredging underway in Cayman*

**Increased sewage** – Increasing populations have inevitably led to an increased sewage output. Analyses of ground water in Bermuda for example, indicate that some contaminants, notably nitrates, are attributable to cesspit seepage. However, the amount and rate of contamination to date has been surprisingly low and has not presented a health threat. Meanwhile, some of the larger hotels and the urban developments dispose of sewage effluent through ocean outfalls which do not extend beyond the outer reef-line. Whilst studies have shown no alarming alteration of the reef ecology, probably due to the high levels of dilution, improved levels of treatment and re-use of this effluent are an ultimate objective.

Heated water from the incinerator and hyper-saline water from reverse osmosis plants is also pumped into the ocean. Monitoring has shown that such inputs have had little or no effect on the marine environment. In Jersey, however, the sewage treatment works empties into an enclosed bay where plankton blooms have been documented. In other territories, the problems of the increasing sewage load accompanying rapidly expanding population growth is exacerbated by the low flushing rates which persist in many of the sheltered bays and harbours where these developments are occurring. St. Helena noted sewage as a developing problem in one specific location.

**Solid waste and dumping of debris** – Increased populations and intensive development have also resulted in large volumes of solid waste. This has been addressed through various methods, including land reclamation (in Jersey, solid waste production

increases by 3% p.a. and this goes into land fill), incinerators, artificial reefs, cleanups, export, and fines.

**Litter/trash** - Increased activity in all of the Overseas Territories and Crown Dependencies inevitably led to increased litter. In the marine environment, plastics, ranging in size from large sheets to microscopic pieces, and helium balloons are a major problem. Marine turtles, whales and seabirds are killed each year from ingesting plastics or becoming entangled in fishing gear. Public awareness, fines and coastal cleanups are the most



*Photo 8. Hawksbill turtle in Bermuda which died after ingesting the jar of plastics shown in the inset.*

common methods for tackling this problem.

**Tourist-related Impacts** – With the expansion of tourism in many of the UKOTs and Crown Dependencies, public awareness of the marine environment has increased significantly, however some aspects of the tourist industry remain unsustainable; coral collection, spear fishing and the trade in endangered species are examples. In most territories, these activities are now prohibited, however other tourist-related impacts include; mooring/anchor damage (managed through protected areas or strategic positioning and the instalment of environmentally-friendly moorings); boat collisions with wildlife (and their habitat (eg. cruise ship groundings), direct wildlife harassment and touching of corals (managed through guidelines for operators and tourists (Bermuda), licensing of operators (Cyprus – turtles), no-go zones and operations restricted to shoreside (eg. Ascen-





*Photo 9. Diver touching a coral in Cayman*

sion); impacts on animal behaviour (controlled by limiting/prohibiting activity); and loss of historic artefacts (managed through legislation, fines, public awareness, Wrecks Act (Bermuda). Most of these problems arise in the Caribbean UKOTs, Bermuda,



*Photo 10. Sting Ray City in Cayman; new guidelines have been implemented to stop handling of the animals, but the animals would appear to have become habituated to the daily provision of food.*

the Channel Islands and Gibraltar and Cyprus, but St. Helena also reports concerns.

### **Light, noise, sonar pollution – Development**

Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, page 131

results in increases of all of these. The impact of light pollution in deterring turtles from nesting has been well documented and the Turks and Caicos noted light pollution as a significant threat. In Gibraltar, noise pollution is deemed a significant threat. In Bermuda, observers note that turtles appear slower to respond to boating traffic perhaps because they are having increasing difficulty in isolating the direction of the threat with the dramatically increased boating traffic. A number of marine mammal strandings have also raised questions about the cause; there has been no documented evidence of sonar pollution but it remains a threat.



*Photo 11. A stranded dolphin is assisted in Bermuda's inshore waters*

In Bermuda, a recent research request to undertake seismic testing was denied on the grounds that the potential threat to marine life was too great.

### **Natural Resource Exploitation**

In recent years natural resource exploitation has expanded beyond fisheries resources to include bioprospecting for compounds of potential valuable for pharmaceutical purposes. Both Cayman and Bermuda report examples of such exploitation; in both territories there have been past examples of overseas companies collecting specimens without contracts being drawn up with the local Government, thereby contradicting the principles of the CBD which call for appropriate local benefit sharing. Many of the territories are also of interest to the scientific community in general and the ongoing, unmonitored collection of specimens should be of concern for potentially threatened species in some jurisdictions. Licensing of researchers, public awareness and the legal protection of endangered species is part of the solution, and territories are being encouraged to develop policies that consider requests from companies to search and sample on



*Photo 12. Sponges are a common target species for pharmaceutical companies looking for compounds of potential value.*

a 'case by case' basis. The establishment of Sites of Special Scientific Interest (SSSIs) for example in the British Antarctic Territory allows regulated access for scientific study in accordance with management plans.

Oil prospecting is currently underway in the Falkland Islands, whilst preliminary exploration for minerals has commenced in Bermuda's waters. Still in the exploratory stage, it is too early to determine what impacts these activities might have on local biodiversity, but in both cases these activities are being carefully monitored. The Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA) and the more recent Protocol on the Environmental Protection to the Antarctic Treaty of 1991, provides an indefinite prohibition on mineral activities at least for the British Antarctic Territory.

### **Global Climate Change**

Beyond the scope of this summary, global climate change must nevertheless be mentioned given the low lying nature of many of the territories and their dependence on their coastal environments. Impacts already being felt include increased coastal erosion from more frequent and stronger storm activity (eg. hurricanes), changes in species composition (eg. White Bream in Jersey) as well as increased incidence of coral disease such as black, white and yellow band disease, as well as bleaching which in many parts of the world have been linked to global warming. There is ongoing monitoring throughout the Caribbean and Bermuda for the incidence of disease, but little means to mitigate against such threats. Global solutions to develop alternative energy sources are not without their impacts also. For



*Photo 13. Band band disease on Caribbean Coral*

example, in Guernsey there is concern about the efforts to generate hydro electric power, whilst there is concern in Jersey about plutonium pollution from the Cap de la Hague nuclear power station on the French coast.

### **Conclusions**

In conclusion it is apparent that the UK Overseas Territories and Crown Dependencies face mounting pressure in trying to protect their shallow water marine zones from increasing levels of development. As more territories, particularly in the Caribbean and Channel Islands look to expand their role in the international business sector, this development shows no signs of abating. Those jurisdictions which have previously been buffered to some extent by their isolation, but which are now evolving into growing tourism destinations are also starting to witness the potential threats such development may pose. Whilst management practices have been developed to try and mitigate against these threats (and in this, there should be much to be learned from some territories about the successes and failures of various approaches), there are a number of notable stumbling blocks. The key problem expressed by most of the territories seems to be the overall lack of an integrated marine spatial plan. Development activities are being carried out in a 'piecemeal' fashion in the absence of an overall vision. Additionally, there is a general lack of awareness with a feeling that no weight is given to biodiversity in decision-making. Instead, there is a sense that protecting the environment continues to be viewed as a 'cost' to society. Adherence to the principles of the Environment Charter is weak throughout the UKOTs and CDs and a general lack of political will is a clearly voiced concern. Poor communication between scientists and policy-



makers is viewed as another significant problem, whilst often the regulatory framework is inadequate, and there is a need to revamp legislation. A lack of capacity and resources is a common theme throughout the territories, and increased regional cooperation is seen as beneficial.

Maintaining the health and integrity of the shallow marine coastal waters is pivotal to both the economic stability of all of the UK Overseas Territories and Crown Dependencies, as well as the preservation of their rich biodiversity. An overarching vision for the sustainable development of the inshore marine zones of each Overseas Territory and Crown Dependency is essential if these are to be maintained.

## References

- (1) Biodiversity: the UK Overseas Territories. 1999. (Eds. D. Procter and Fleming, L.V.). Joint Nature Conservation Committee. pp. 131.
- (2) Anderson, C., H. De Silva, J. Furbert, A. Glasspool, L. Rodrigues, W. Sterrer and J. Ward. 2001. Bermuda Biodiversity Country Study. Bermuda Zoological Society. pp. 103
- (3) Lefroy, J.H. 1877. Memorials of the Bermudas. Reprinted 1981 by Bermuda Historical Society and Bermuda National Trust, Bermuda 2 volumes, 772
- (4) Smith S.R. 1999. Impact of the construction of Kindley Field Airbase on the Marine Environment of Castle Harbour, Bermuda. Ministry of the Environment.
- (5) Reefs at Risk in the Caribbean. 2004. (Eds. L. Burke and Maidens, J.). World Resources Institute. pp. 80

This is Contribution #123, Bermuda Biodiversity Project (BBP), Bermuda Aquarium, Natural History Museum and Zoo.



© Annie Glasspool - 2004



# Review 3: Marine Protected Areas in territorial and EEZ waters of UK Overseas Territories and Crown Dependencies: useful tools in the box?

**Dr Mike Brooke, Department of Zoology, University of Cambridge, and Chairman UKOTCF Pitcairn WG**

Brooke, M. 2007. Marine Protected Areas in territorial and EEZ waters of UK Overseas Territories and Crown Dependencies: useful tools in the box?. pp 134-137 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

This presentation reviews Marine Protected Areas (MPAs) in the territorial and Exclusive Economic Zone (EEZ) waters of United Kingdom Overseas Territories (UKOTs) and Crown Dependencies. Whereas most territories and dependencies have some sort of protected area(s) lying offshore, many of the areas were established primarily to protect onshore or coastal features, for example sites registered within the international World Heritage and Ramsar Wetlands of International Importance Conventions. In such cases the truly marine component of the reserve is incidental but nevertheless valuable, especially when it extends as far as 12-nautical mile territorial limits. That said, there are MPAs of various status across the UKOTs. I examine the variety of ways by which MPAs have been established and try to identify what features are associated with a MPA achieving its aims, and what features are associated with a lack of success. Based on information supplied from the territories and dependencies, I attempt to identify where new MPAs could most beneficially be designated in the near to medium future. Ensuring the effective protection of offshore MPAs is likely to be major constraint. 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.

**Michael de L. Brooke**, Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ, United Kingdom; [mb10005@cam.ac.uk](mailto:mb10005@cam.ac.uk)

This talk brings together scattered information provided by a generous network of correspondents on the Marine Protected Areas (MPAs) currently existing in the UK's Overseas Territories and Crown Dependencies, considers their effectiveness, and details where further MPAs could usefully be established.

In the Crown Dependencies there are no reserves which are formal MPAs. However Alderney, Guernsey and Jersey have designated Ramsar sites which include features of considerable marine interest. Since the Ramsar definition of wetlands is broad, "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh,

brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres", there is evidently scope for using the designation for protecting nearshore marine areas.

In the Caribbean Territories, MPAs are found in Anguilla, in Bermuda in a multiplicity of forms, in the British Virgin Islands, in the Caymans (numbering 26) and in the Turks and Caicos (34). Only Montserrat lacks any MPA or equivalent.

In the 'tropical' Territories, MPAs are absent from the Pitcairns, have been proposed but not designated in Ascension, designated but not adopted in St Helena, and actually established in BIOT and Gibraltar.

Turning to the Southern Oceans, Tristan da Cunha has *de facto* MPAs, since the Gough and Inaccessible Island Nature Reserves have been extended to 12 nautical miles offshore. The Falklands and South Georgia & South Sandwich Islands lack MPAs. The British Antarctic Territory has many, and they will be discussed later in this presentation.

While this brief survey may give the impression that MPAs are effectively members of one species, such an impression would be false. The protected areas actually come in many guises, tailored to local circumstances. This is especially well exemplified by Bermuda where: -

1. The entire 200 mile EEZ is a marine mammal preserve.
2. "Areas to be avoided" are indicated to shipping with the aid of multi-million dollar expenditure on navigational radio beacons.
3. Coral reef preserves have been established to prevent damaging land reclamation.
4. 39 protected areas are designated and provided with permanent mooring buoys (to reduce or eliminate anchor damage). Within the areas, there is no line, spear or lobster fishing.
5. One strict Marine Park exists where this is no mooring, anchoring, or fishing.
6. No fish pots, or spear fishing are permitted within one mile of the shore while there are additional areas where net fishing is prohibited.
7. Seasonally protected areas with specified aims, for example protection of grouper spawning grounds, are gazetted.
8. In sea-grass areas, planning applications are discouraged.
9. Special measures may be taken to protect species of local or global conservation concern.
10. Historic wrecks may or may not be closed to diving.

Clearly this variety of marine conservation measures has been possible only because Bermuda is a populated and prosperous Territory, with resources available to consider carefully what is required to effect useful marine conservation, and then to designate, monitor and enforce. Such luxuries are simply unavailable in many Territories where the marine protection framework is necessarily cruder. This alternative situation is exemplified by BIOT.

In BIOT a Conservation Zone was established in 2003 stretching from the 200 mile limit to within 6 miles of the coast. In practise it remains to be seen

what practical effect this designation has. There are additional Strict Nature Reserves centred on Eagle Island and Peros Banhos in the west and north of archipelago, respectively. Finally, the populated island of Diego Garcia contains a Ramsar site in which are Strict Conservation Areas, Restricted Areas and beach walking areas, which together accommodate a variety of uses and users.

A variety of uses - but perhaps not users - is also reflected in the many protection categories created in the Antarctic Treaty area, of which the British Antarctic Territory is an important part. That importance is reflected (table below) in the relatively high numbers of at least some protected area categories that are to be found in the British Antarctic Territory and South Sandwich Islands when viewed as a proportion of all such areas within the Antarctic Treaty region.

**Table. Types of Protected Area in the Antarctic Treaty region**

N = Number in BAT or SSI/Number in whole treaty area

	Category of protected area	N
A	Fully and partially marine Antarctic Specially Protected Areas (ASPAs) of interest to CCAMLR	5/10
B	Antarctic Specially Protected Areas (ASPAs) with a marine component (not requiring CCAMLR approval)	5/6
C	Antarctic Specially Managed Areas (ASMAs)	2/3
D	Multiple-use Planning Areas (MUPAs)	0/1
E	CCAMLR Ecosystem Monitoring Program (CEMP) Protected Areas	0/3
F	Convention for the Conservation of Antarctic Seals (CCAS) Seal Reserves	2/2
G	CCAS Sealing Zones	0/6
H	Marine Protected Areas under proposal	0/2
I	Marine Protected Areas within the CCAMLR Convention Area under national jurisdiction	

It is perhaps no coincidence that the three Territories whose MPA networks I have described in some detail include one that is large (in population terms) and wealthy, and two that largely uninhabited. I would argue that networks can be most read-

ily established either where there is extensive local expertise or where there are (virtually) no people, and therefore no vested interests to resist designation. The problems arise in Territories of modest capacity where resources are sparse and yet there are enough voices and vested interests to make reserve designation contentious.

Given the variety of types of MPA, there is a wealth of reasons why MPAs are designated. However, these reasons can usually be placed within one of three over-arching umbrella categories. These first is that the area is a more or less intact and representative example of some particular type of marine ecosystem. The second is that the protection of the area may have scientific importance, in providing a control to help distinguish between the effects of harvesting and natural ecosystem changes, and in providing an area for study not subject to human interference. The third is the protection of an area or species potentially vulnerable to human activities such as a coral reef or a sea mount. Perhaps surprisingly no correspondent mentioned as a reason for establishment the role that MPAs are known to have in providing a refuge in which numbers of fished species can build up and spill out into the surrounding areas to the benefit of fishermen.

Even well-endowed Territories are likely to face problems policing MPAs. The problem is yet more acute in remote and barely inhabited Territories. Both Territory classes are faced with patrolling a 200-mile EEZ that may cover a sea-area the size of England. In such circumstances, it is evident that enforcement is likely to be difficult or impossible. Even a dedicated fishery protection vessel is barely sufficient. That assumes a vessel is available which, at present, is not the case in most Territories. This situation is unlikely to change given a reluctance of the British Government in London to fund such vessels. Only when a local fishery exists on a scale sufficient to provide license fees adequate to run a protection vessel is there a fair prospect of offshore MPA enforcement.

Currently this outcome has been realised only in the Falklands, and South Georgia.

Enforcement of nearshore reserves that are often extensions of onshore reserves is a more attainable aim, and it is one that could be pursued in more UK Overseas Territories.

Despite these difficulties, correspondents mostly reacted positively when asked whether MPAs in their Territories were effective, with, for example, positive impacts on local fisheries reported from Turks and Caicos and Tristan da Cunha. However, Anguilla and British Antarctic Territory reported an absence of evidence and this is likely to be more generally true than indicated. The monitoring protocols needed to establish whether MPAs are or are not effective are simply not in place on an adequate scale. This is not likely to change in the short-term, bearing in mind how difficult it has proven to establish effective monitoring in the mainland UK.

Many Territories and Crown Dependencies reported aspirations to establish further MPAs. These included, from north to south: -

Isle of Man – south coast areas

Jersey – St Ouen's area

Anguilla – Prickly Pear area to provide linkage



*The islands of British Indian Ocean Territory shown at the same scale as England and Wales. BIOT's Exclusive Economic Zone (and Conservation Zone) if shown at the same scale would extend well into the Irish and North Seas, the English Channel and Scotland.*



between existing PAs  
Ascension – but progress constrained by lack of  
resources  
St Helena – offshore stacks but resource shortage  
as above  
Tristan da Cunha – seamounts but uncertain how  
protection could be enforced  
South Georgia – MPAs under consideration  
Antarctic Treaty area – high seas MPAs under  
consideration.

In general, correspondents were positive when reporting their experience with MPAs. However, there is a clear need for establishing more such areas, ensuring that protection is enforced and that the areas are not ‘paper parks’, and for monitoring whether the MPAs actually achieve the aims for which they were designated.

### **Acknowledgements**

For the information on which this article is based, I am grateful to Tim Austin, Emma Bennett, Jo Birch, Liz Charter, Wesley Clerveaux, John Cooper, Charles David, Mike Freeman, Roland Gauvain, James Glass, Annie Glasspool, Susie Grant, Mike Hentley, Geoff Hilton, Gordon Liddle, Farah Mukhida, Grant Munro, Marsha Pardee, Tara Pelembe, Isabel Peters, Mike Pienkowski, Mike Richardson, Charles Sheppard, David Stock.



# Discussion following the review presentations

## Questions, Answers and General Comments

### Bycatch in fisheries

The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) was set up with an ecosystem approach under the Antarctic Treaty. There is a good suite of mitigation measures. Raising awareness of these with other fisheries (Regional Fisheries Management Organisations – RFMOs) is required. The Agreement on the Conservation of Albatrosses and Petrels (ACAP) needs to be used to influence fisheries and mitigation measures. The lead is being taken by the UK in assessing the level of bycatch by ACAP members fishing in the S. Atlantic, and will give an awareness of the scale of the problem and the mitigation measures to be introduced.

The Falkland Islands and South Georgia monitor Exclusive Economic Zones (EEZ) using two fisheries patrol vessels. There is also aerial surveillance and satellite surveillance. Licenced vessels are also monitored via GPS. In addition, there is self-monitoring by licensed fishing vessels.

Satellite tracking relating to ACAP might be of use in the future for tracking illegal fishing vessels.

Reference was made to a UK Defra-led action plan, with the question as to whether other territories were being drawn in, but participants were unaware of this.

There were difficulties in the suggestion of a sharing agreement between Falkland Islands and other South Atlantic islands (e.g. Ascension).

It was noted that blue-dyed fish bait increases fish catch and decreases turtle by-catch. There was an economic saving to the fishery of not catching albatross as a bycatch. Saving albatross from by-catch was not yet reflected in increased population. There were other pressures in other areas, with long-lived individuals with onset of breeding at a late age, and not breeding in every year. There might not be measurable increased recruitment for 10 years. Also, the fisheries in the Falklands represent only a small area of the fisheries that affect albatrosses.

## Development issues in inshore marine zones

Concerns were expressed that anti-fouling paint containing TBT was still being used in many places. In BVI it affects conch and makes them infertile. In France and Britain it impacted on dogwhelk. Unfortunately new anti-fouling paints are also toxic.

### Marine Protected Areas

In some areas, for example the Marshall Islands, fisheries enhancement is the only way in which MPAs can be “sold” as there is no tourism. Therefore protection of seagrasses was promoted for fisheries enhancement to make it acceptable to the public.

### Specific discussion relating to subjects proposed in the introductory paper

#### Ensuring existing and new marine fisheries are managed in a sustainable manner

The Foreign & Commonwealth Office is responsible for EEZs, and also take the lead on CCAMLR. The regulation of long-line fishing in Tristan da Cunha is a massive problem, and UK will miss ACAP targets by far if something is not done. Ascension now has the right to sell its own fishing licences (since 2004) but for Ascension the reply to each of the four questions under this heading in the Introduction is “no”. Falklands had received large funding for the start up of their fishery. Would there be any funding for the start-up of the Ascension fishery? It was acknowledged that there was a huge challenge regarding ACAP targets. Work was being done with RFMOs, and also alongside partners such as RSPB and Birdlife, to try to get people on ships to use mitigation measures. Policing was impracticable with current resources.

It was noted that the French authorities were now quite active, using satellites which can scan boats for a signal, and sending policing boats to those fishing without a signal. Why not have extensive collaboration between countries on this? Technicians and officials in Brussels should be lobbied to ensure a vessel monitoring system (VSM) At the Greenland meeting of EU and OCTs, the Falklands representative had spoken about the lack of

EU involvement in policing in the South Atlantic. Members of CCAMLR have to have 100% monitoring.

One thing that was needed now was an immediate point of contact when situations occurred. Illegal fishers have got away in the past in Ascension, even though UK had been informed.

### **Ensuring tourism and other development activities are properly managed**

Aquaculture raises many issues, e.g. breeding alien species, dredging, nitrification, damage to mangroves, fishing to provide food (junk fish) for farmed fish.

Cayman has an aquaculture policy. The legislation has not yet happened, but they do have a draft bill.

This issue was relevant to JNCC and its economic development tools. There was a need to tie dollar values to resources under threat. The information available to date is not specific and very dated. It was hoped that this could be explored with JNCC and assistance given.

One problem was that assessing environmental impact tends to happen at the individual project scale, and ignores the cumulative effect of, for example, 5-10 similar developments in the same area. Concerns were expressed on aggregates and fossil fuel licensing on the sea bed.

There was a clear need for advice and guidance in UKOTs on marine issues. JNCC could help with fisheries, MPAs, environment and impact assessment – including oil and gas. JNCC agreed to discuss further what more they can do to help UKOTs and CDs with their needs.

Is income from development activities adequately supporting conservation efforts? Absolutely not. In BVI development areas were affecting existing MPAs, not supporting them.

### **Protecting habitats and species**

In BVI lots of work had been done but it was very hard to compete with major development projects; small islands have small spaces. The importance of independent NGOs was highlighted in putting pressure on government. An example was given of a territory which did not have effective NGOs because the government did not want them. In this

example the government simply decided what it wanted, and what it would do.

BirdLife International have a best practice document available for undertaking risk assessments and plans of action for seabirds. One needs to be produced for turtles.

### **Making use of international bodies**

Some specific examples were discussed.

CITES is moving more towards marine species, and could be the right mechanism to support fishery management. It has teeth, and has closed fisheries down. Gibraltar implements CITES (but leaving most of the work to an NGO), but there was no follow-through. What do you do with the animals which are seized as a result of CITES?

The World Heritage Convention currently has a huge emphasis on sites that are marine or a large percentage of marine environment. Tristan has two islands which form a World Heritage site. The question was “what is the value of these sites?”. They highlight the value for tourism, develop a sense of pride in people who live in or near a World Heritage site, and provide emotional tools for engagement. The disadvantages were relatively low, there was paperwork to get registered, and the need for a management plan.

There were issues on islands where people do not feel able to speak out. The question was raised as to whether UKOTCF could raise issues and apply pressure to local bodies and others. Is that what this conference wanted UKOTCF to do? UKOTs should let the Forum know of any such issues to raise in its meetings with FCO and others.

### **Resourcing conservation efforts**

There was unanimous concern over the lack of funds, budgets and a generic capacity problem in UKOTs for environmental work.



# Poster: Assessment & Improved Management of New and Existing Marine Protected Areas in the British Virgin Islands

**Joseph Smith Abbott, British Virgin Islands National Parks Trust**



Smith Abbott, J. 2007. Assessment & Improved Management of New and Existing Marine Protected Areas in the British Virgin Islands. p 140 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

This OTEP funded project aimed to assess the efficacy of the BVI's existing Marine Conservation Programme (MCP), and develop ways to improve it. The BVI NPT had a proposed system of Marine Protected Areas (MPAs) and wanted to determine (a) whether these areas were representative of all marine habitats within the BVI that required protection, especially habitats of critical importance, (b) how well were the MPAs performing and their effectiveness on the marine environment and stakeholder use through the acquisition of baseline ecological data and, (c) what adaptive management practices were required to ensure the Trust's ability to conserve, manage or restore these key marine habitats? These questions were answered during this two year project conducted in collaboration between the BVI National Parks Trust, Conservation and Fisheries Department, and Dr. Charles Sheppard of the University of Warwick.

**Joseph Smith Abbott**, British Virgin Islands National Parks Trust, P O Box 860, Road Town, Tortola, British Virgin Islands. [director@bvinationalparkstrust.org](mailto:director@bvinationalparkstrust.org)

# Poster: The British Virgin Islands Marine Conservation Programme

**Nancy K Woodfield Pascoe, British Virgin Islands National Parks Trust**



Woodfield Pascoe, N.K. 2007. The British Virgin Islands Marine Conservation Programme. p 141 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Marine conservation and management ensure habitat and species survival and provide for adequate fish stocks and enhanced visitor enjoyment, while protecting delicate coral reefs. Through the Marine Conservation Programme, the BVI National Parks Trust has actively conserved coral reef environments from anchor damage by the installation of mooring buoys at popular dive and snorkel sites throughout the BVI. The programme is manned by a staff of six (6) Marine Wardens who are responsible for the maintenance and patrol of these moorings. The programme is administered by a Marine Programme Coordinator, based in the Trust Office. Fees collected for the use of the moorings represent a substantial component of revenue generated by the Trust.

**Nancy K Woodfield Pascoe**, Planning and Development Coordinator, British Virgin Islands National Parks Trust, P O Box 860, Road Town, Tortola, British Virgin Islands. [nkwoodfield@yahoo.com](mailto:nkwoodfield@yahoo.com)

# Poster: Environmental Impact Assessment and Tidal Power; filling the legislative vacuum: A case study from Alderney (Bailiwick of Guernsey)

**Roland Gauvain, Alderney Wildlife Trust**



Gauvain, R. 2007. Environmental Impact Assessment and Tidal Power; filling the legislative vacuum: A case study from Alderney (Bailiwick of Guernsey). p 142 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Alderney's tidal races (the Alderney Race and Swinge) are recognised as being one of the Europe's most powerful tidal resources. With the recent growth in the development of tidal energy devices, and due to the political situation of the island Alderney is the only Island within the British Isles to own and control its own seabed (approximately 90 sq.miles), Alderney finds itself in a unique position.

The poster display will layout the processes taking place within the political, commercial and environmental sectors, which is leading towards the placement of the first tidal devices within Alderney's waters.

- The creation of an independent body to oversee all aspects of tidal power development within Alderney's Waters.
- The establishment of a commercial agreements between State and developer.
- The development of an Environmental Impact Assessment framework, both the establishment of a baseline and longer term environmental scoping and device specific Impact Assessment.
- The creation of a legislative framework.
- The development of monitoring and control processes.

The purpose behind the display is to layout the current tidal power development strategy on Alderney in brief and highlight what might be considered its successes and failures.

**Roland Gauvain**, Alderney Wildlife Trust, 34 Victoria Street, St Anne, Alderney GY93TA, Channel Islands. [manager@alderneywildlife.org](mailto:manager@alderneywildlife.org)



# Poster: Bermuda Reef Ecosystem Assessment and Mapping (BREAM) Programme 2006

**Thaddeus J.T. Murdoch, Anne F. Glasspool, Mark Outerbridge, J. Clee, C. Lustic, A. Wanklyn, A. Batson, Mike Colella, G. Toro Farmer and E. Salas,**  
Bermuda Zoological Society



Murdoch, T.J.T., Glasspool, A.F., Outerbridge, M., Clee, J., Lustic, C., Wanklyn, A., Batson, A., Colella, M., Toro Farmer, G. & Salas, E.. 2007. Bermuda Reef Ecosystem Assessment and Mapping (BREAM) Programme 2006. pp 143-144 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Bermuda's coral reef system is particularly significant in that it is the most northerly in the world. Over the past couple of decades, there has been a dramatic decline in the health of coral reef systems globally. Estimates indicate that about 27% of the world's reefs have been degraded beyond recovery and a further 16% are under serious threat. Whilst coral reefs throughout the rest of the Caribbean have suffered dramatic declines in the amount of living coral, Bermuda is one of the few remaining locations with relatively healthy reefs, probably in part due to the fact that our corals are isolated from many of the destructive processes found further south, and because all corals and herbivorous fishes are completely protected across the island. For this reason Bermuda's shallow water marine habitats are not only important locally, but also regionally.

The BREAM project, has been launched in recognition of the fact that there is a need firstly, to support multidisciplinary studies of Bermuda's coral reef complex to eliminate the information gaps; secondly, to properly document and orchestrate data collection, management and sharing in order to promote improved local, regional and international understanding of coral reef systems; thirdly, to integrate the resource managers, the scientific community and the users in the management processes to define common goals and to recognise the significant pressures and conflicts that are placed upon our marine environment; and finally, to promote a range of public awareness programmes, with the goal of encouraging care of our unique coral reef ecosystem.

At present, baseline surveys are being conducted across the entire shallow water marine platform to assess the ecological condition and biodiversity of the reefs. Protocols and a preliminary overview of the findings are presented.

**Thaddeus J.T. Murdoch, Anne F. Glasspool, Mark Outerbridge, J. Clee, C. Lustic, A. Wanklyn, A. Batson, Mike Colella, G. Toro Farmer & E. Salas,**  
Bermuda Zoological Society, P.O. Box FL 487, Flatts, Bermuda, FL BX. E-mail: [tjmurdoch@gov.bm](mailto:tjmurdoch@gov.bm)

## Introduction

The Bermuda Reef Ecosystem Assessment and Mapping (BREAM) Programme began in 2004, and focuses on the marine aspect of the Bermuda Biodiversity Project.

One of our goals is to collect data on the ecological condition and biodiversity of coral reefs located over the entire Bermuda Seamount, and to continue

monitoring these marine communities over an ecologically meaningful length of time.

In the summers of 2004 and 2005 we assessed the ecological condition of the corals, algae and fish at 25 rim reef sites, 35 lagoonal patch reefs and four forereef sites using a modified version of the Atlantic and Gulf Rapid Reef Assessment (AGRRRA) and Reef Environmental Education Foundation (REEF) survey protocols.

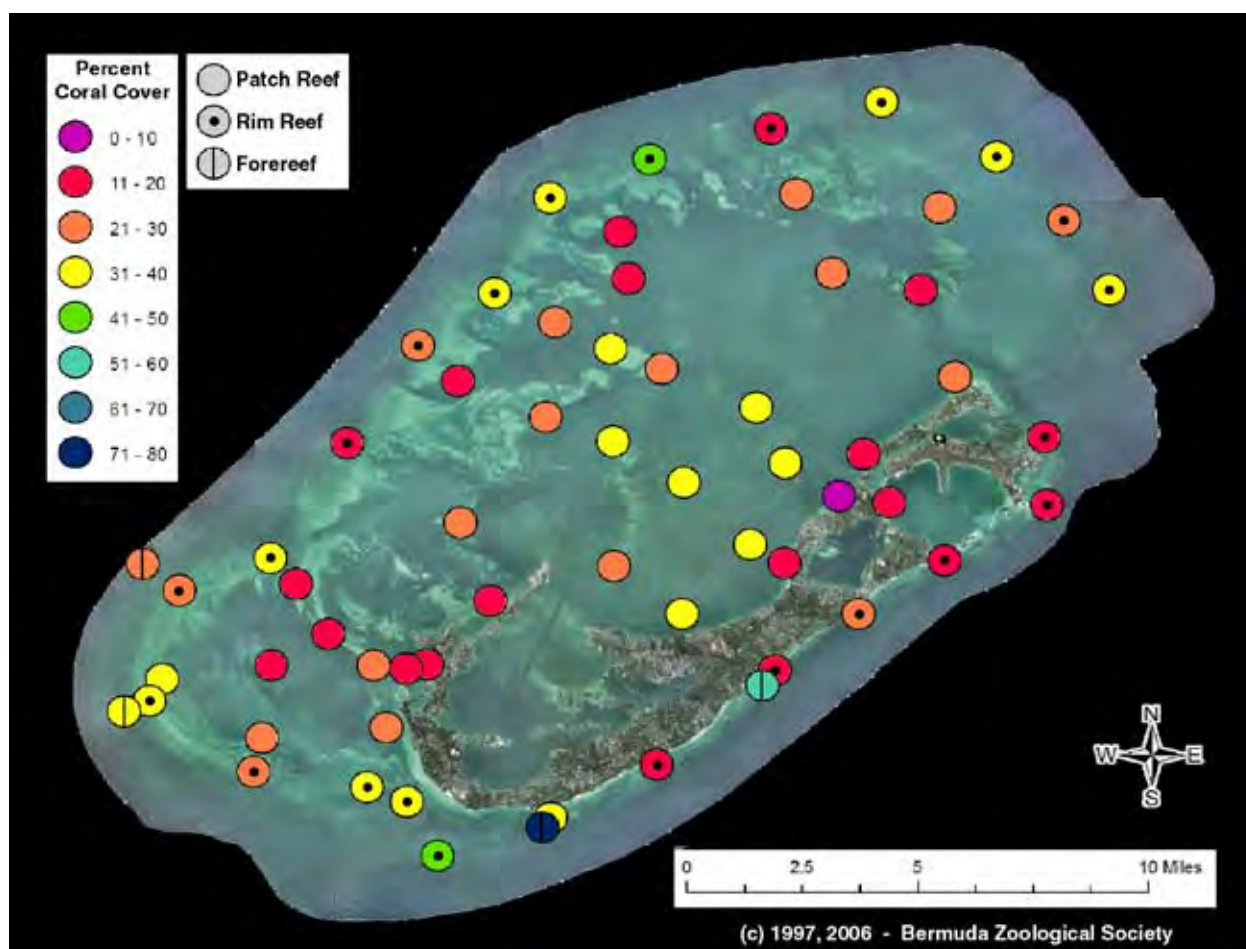


Fig 1. A GIS map showing the location and relative coral cover of patch, rim and forereef reef assemblages across the Bermuda reef platform

## Reef Corals

At the 64 sites, team members accounted for a total of 3,658 stony corals, on 297 transects. Coral cover varied from a low of less than 10% to a high of over 75% of the benthic substrate. Fore and rim reefs consisted of almost identical stony coral species assemblages, dominated by *Diploria strigosa* and *Diploria labyrinthiformis*. Species diversity was relatively low both on the rim reef ( $H' = 1.288$ ) and on the fore reef ( $H' = 1.215$ ). Families represented on these reefs, in order of abundance, include *Diploria*, *Porites*, *Montastrea*, and *Millepora*. Lagoonal patch reefs were characterized by the highest species diversity ( $H' = 2.094$ ) and were dominated by *Porites astreoides* and *D. strigosa*. This habitat also supported the greatest number of families, including *Diploria*, *Porites*, *Montastrea*, *Millepora*, *Madracis*, *Oculina* and *Stephanocoenia*.

## Reef Fish

Team members recorded a total of 18,510 fish on 1,320 transects. Patch reef assemblages consisted of almost 75% haemulids, with pomacentrids,

scarids and acanthurids making up most of the remainder and were less diverse than the other three habitat types ( $H' = 2.169$ ). Fore and rim reef assemblages were almost identical. The reef fish communities in these habitats were dominated by scarids and acanthurids. The species diversity in these habitats was high ( $H' = 2.878$ ,  $H' = 2.816$ , respectively).

In 2006 we plan to survey additional forereef sites at depths of 10- and 20-m, completely encompassing all reef habitats across the Bermuda platform. The information collected will be used to better guide marine research, resource management and education.

## Acknowledgements

BREAM is supported through a grant from the Department of Conservation Services and the Mr and Mrs Anthony Jonklaas of the Kenridge Fund.

This is Contribution # 133, Bermuda Biodiversity Project (BBP), Bermuda Aquarium, Natural History Museum and Zoo.

# Poster: Assessing the conservation status of the critically threatened Spectacled Petrel

Contact: Geoff Hilton, RSPB



Hilton, G. 2007. Assessing the conservation status of the critically threatened Spectacled Petrel. pp 145-146 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6th to 12th October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

An OTEP-funded project, executed by the Royal Society for the Protection of Birds, the Tristan da Cunha Natural Resources Department, the University of Cape Town and Projeto Albatroz, Brazil.

**Dr Geoff Hilton**, Royal Society for the Protection of Birds, c/o Sociedade Portuguesa para o Estudo das Aves (SPEA), Rua da Vitória nº 53, 3º Esq., 1100-618 Lisboa, Portugal. [geoff.hilton@rspb.org.uk](mailto:geoff.hilton@rspb.org.uk)

## Project Background

The Spectacled Petrel *Procellaria conspicillata* is 'critically endangered', and, so far as is currently known, endemic to Inaccessible Island in the Tristan da Cunha group. It was given its very high threat status because it was thought to have a small population that was likely to be declining because of high mortality as longline fishing bycatch.

A previous population census in 1999, and an estimate of longline mortality in 2000 were in urgent need of updating, and it was feared that the species might be getting close to extinction. This project attempted to determine the current conservation status of the species.

Spectacled Petrels are large, burrow-nesting seabirds. Their at-sea distribution and ecology are not well understood, though they are known to be among the most abundant birds foraging around fishing vessels off the Brazilian coast.

## Activities and Results

### Census of the breeding population on Inaccessible Island

A repeat of the 1999 breeding census was conducted during the 2004 breeding season, led by the University of Cape Town. The census involved estimating the number of burrows in all nesting colonies, coupled with intensive counts in a sample of these colonies to determine the proportion of burrows that are missed during estimated counts. The proportion of burrows that were actually oc-

cupied by an incubating pair was estimated using a combination of methods; in particular, we determined the call-response to tape-playback of calls at burrow entrances. The number of breeding pairs was derived from the total number of estimated burrows, and the apparent occupancy rate of these burrows.

The census indicated that the population had increased rapidly since 1999. The 2004 population was thought to be around 10,000 breeding pairs, compared to 7,000 breeding pairs in 1999 – an increase of ca. 45%, or 7% per annum. This remarkable result was unexpected and very heartening, but posed new questions: how could the population be increasing so rapidly, in the face of apparently massive adult mortality? We concluded, based on the limited historical data available, that the population has probably been undergoing a sustained recovery since the early twentieth century, when introduced pigs *Sus scrofa* – which were probably catastrophic predators of nesting Spectacled Petrels – died out on the island. Other conditions were so favourable (because the population was well below carrying capacity) that the development of longline mortality did not prevent the increase from continuing. Also, since earlier population censuses probably under-estimated the true population size, the estimated longline mortality was somewhat less severe, in terms of the proportion of the total population killed each year.

### Assessment of the current rate of longlining mortality

Observers were placed by Instituto Albatroz on



nine pelagic longline cruises performed from April to December 2005 off Brazil. In total, onboard observers recorded data from 117 longline sets and 115,730 hooks deployed, to estimate current rates of seabird bycatch, fishing locations, catches and bycatch mitigation behaviour.

An extensive review of data on Spectacled Petrel occurrence and seabird bycatch in demersal and pelagic longline fisheries in the Southwest Atlantic Ocean was conducted. A new longline database and GIS system was developed by Instituto Albatroz.

No Spectacled Petrel or other seabird was killed during the observed cruises. It is difficult to interpret these data clearly, because only a small proportion of total longline effort could be covered, and mortality is known to be highly stochastic. Bycatch mitigation measures were not used on these cruises.

Abundance data showed that Spectacled Petrel is the most frequent and abundant species attending vessels. Other common species were Great Shearwater *Puffinus gravis*, White-chinned Petrels *Procellaria conspicillata*, Atlantic Yellow-nosed Albatross *Thalassarche chlororhynchos*, Black-browed Albatross *Thalassarche melanophrys* and great albatrosses *Diomedea* spp. The great majority of these birds is likely to have originated in the UKOTs of Falkland Islands, South Georgia and Tristan da Cunha, indicating the importance of Southwest Atlantic waters for OT's seabird populations.

#### **Assessment of whether there might be another breeding location**

Recent sightings of rafting birds off the coast of Tristan da Cunha suggested that there might be a second nesting population on this island. Other islands in the region might conceivably also support undiscovered populations: although the species comes ashore during daylight in the breeding season, so is not hard to detect, it is a winter-nester, and very little fieldwork generally takes place at this time of year.

New searches were conducted on land and from sea in the remoter areas of Tristan da Cunha during winter 2004. In addition, genetic material was taken from 50 breeding birds on Inaccessible Island, and from more than 100 birds caught alive (and released) at longline vessels off Brazil. Microsatellite analysis of the samples was used to examine

whether the birds at the longlines were from the same population as the Inaccessible Island breeders. A genetic difference between the Brazil birds and the Inaccessible birds might indicate that there is a second, unknown, breeding population represented among the birds feeding off Brazil.

The searches on Tristan da Cunha did not reveal any Spectacled Petrel colonies, and indeed, other petrel populations on Tristan da Cunha seem now to be only remnants: cats and rats have destroyed the once enormous colonies. The genetic analysis has just been completed, and results are being analysed.

# Topic 5: Integration of conservation and sustainable livelihoods: Terrestrial

Session Organiser: Dr Oliver Cheesman, UKOTCF Council

## Integration of Conservation and Sustainable Livelihoods: Terrestrial – Introduction, Overview and Conclusions

Dr Oliver Cheesman, UKOTCF Council

Cheesman, O.D. 2007. Integration of Conservation and Sustainable Livelihoods: Terrestrial – Introduction, Overview and Conclusions. pp 147-149 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

**Oliver D. Cheesman**, 108 Cholmeley Road, Reading, RG1 3LY, UK.  
[oliver@dipsacus.org](mailto:oliver@dipsacus.org)

### Introduction

Most of us who work in nature conservation, or related environmental fields, feel that we are contributing to the pursuit of sustainability or sustainable development, although our interpretations of these terms may differ in subtle ways. Sustainability (or sustainable development) has been defined in various ways. An influential and memorable interpretation is that given in the Brundtland Report (WCED 1987): “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Subsequently, sustainability has come to be seen more precisely in terms of the interaction of the social, economic and environmental dimensions of human endeavour (see e.g. Adams 2006). Thus, the pursuit of sustainability can be seen as the intersection of efforts to enhance the environment, the economy, and society (as described, for example, in relation to work towards sustainability in the States of Jersey - see Freeman, this volume). Various combinations of environmental, economic and social elements can be said to underpin the concept of livelihoods. The idea of sustainable livelihoods is preferred to that of sustainable development by many workers (e.g. Sneddon 2000),

because it represents a more ‘people-centred’ approach. Sustainable livelihoods emphasises the role of local communities, and the importance of their participation in the development of strategies for natural resource management (e.g. Pound *et al.* 2003).

The international community has increasingly embraced the concept of sustainability at a global level. It is



embedded in the 1992 Convention on Biological Diversity (CBD), notably in the call for sustainable use of biodiversity and advancement of the ecosystem approach (see also CBD 2002). The 2000 Millennium Development Goals (MDGs) acknowledge the need for sustainable use of environmental resources, and sustainability took centre stage at the World Summit on Sustainable Development (WSSD) in 2002, and in the Plan of Implementation that arose from that meeting. The urgency of the need to adopt a more sustainable approach was re-emphasised by the Millennium Ecosystem Assessment (MEA) which reported in 2005, highlighting the extent and rate of global environmental degradation as a result of unsustainable exploitation of natural resources.

At a regional level too, the importance of sustainability has been increasingly recognised in recent years, not least for small island communities whose natural resources can be particularly fragile. For example, at around the same time as the Jersey Conference, the 2006 Pacific Island Forum saw renewed commitments to linking conservation and development made at the Global Island Partnership event *Beyond the Micronesia Challenge: Sustainable Livelihoods for Pacific Communities*, and 2006 also saw at least two major conferences on sustainable tourism held in the Caribbean region. At a national level, sustainability is increasingly integrated into country plans and strategies, including those addressing biodiversity, environmental management and economic development. In the context of the UKOTs, sustainability is an important aspiration of most, if not all, of the Environment Charters.

Despite the apparently enthusiastic adoption of the principles of sustainability, sustainable development and sustainable livelihoods at these various scales, serious questions remain over real progress towards sustainability in practice. As Adams (2006) puts it:

“On the one hand, the twenty-first century is widely heralded as the era of sustainability, with a rainbow alliance of government, civil society and business devising novel strategies for increasing human welfare within planetary limits. On the other hand, the evidence is that the global human enterprise [is] rapidly becoming *less* sustainable and not more. Much has been achieved – but is it enough? Are global trends towards sustainability or away from it? Have the concepts of sustainability and sustainable development offered a coherent

basis for change?”

## Session Overview and Conclusions

Such questions are often most usefully addressed with reference to activities at a local level. The Jersey Conference session on the integration of conservation and sustainable livelihoods in terrestrial environments included four presentations, describing work from very different parts of the world, and involving very different core elements. Gordon Liddle (Government of South Georgia & the South Sandwich Islands) spoke about South Georgia, a UKOT with no indigenous population and a relatively pristine environment, where the impacts of visitors can be relatively easily managed. In this context, the concept of livelihoods is very different to that applied in most other situations. However, it remains relevant in relation to generation of income for tour operators, and fees accrued by the local government which has responsibility for environmental management in the face of a number of challenges. Bryan Naqqi Manco (Turks & Caicos National Trust) described work in the Turks & Caicos Islands, where the small communities of Middle Caicos have been key participants in the development of a biodiversity management plan, and the development of small scale, low impact eco-tourism. Indeed, the impetus for this project came from the local communities themselves. They sought to preserve their natural and cultural heritage, and to stimulate local economic activity based on an alternative model to the usual large-scale built developments (resorts) for tourists, which often appear to conflict with the protection of the local environment and culture. Dick Beales (Department for International Development, UK Government) gave an overview of the proposed airport for St Helena. This major infrastructural development project is seen by many as essential to the survival of local communities here (the human population has contracted from 5500 to 4000 in just 10 years), but has substantial implications also for local biodiversity – on the conservation of which the viability of future tourism will depend in large part. John Mauremootoo (CAB International, formerly of the Mauritius Wildlife Foundation), the 2002 winner of the prestigious Whitley Award for International Nature Conservation, described the situation in Mauritius and Rodrigues. Here, efforts have focused on mainstreaming conservation objectives (in particular, ecosystem restoration following environmental degradation brought about by alien invasive species), by linking them



to other national priorities such as watershed management. Such approaches have proven to be very effective elsewhere in leveraging additional resources for conservation, in the wider context of sustainable development (see Mauremootoo, in Topic 6 of this volume). The damage to ecosystems caused by species invasions illustrated clearly how environmental degradation can itself impact negatively on livelihoods.

Lively discussions followed each of the presentations. The session concluded that 'integration' was the key word in 'integration of conservation and sustainable livelihoods'. Opportunities needed to be grasped which reminded policy makers in particular that biodiversity was part of the solution, and which reminded those concerned with conservation that 'the human dimension' also needed to be part of their agenda. Processes which engaged all stakeholders from an early stage were most likely to succeed in these aims, and in the wider aim of integrating conservation and sustainable livelihoods. Creative solutions adapted to local needs would more likely be found where all stakeholders were engaged in the process. It was acknowledged that (eco)tourism had considerable value as a potential vehicle for the integration of conservation and sustainable livelihoods in many island situations. However, management of tourism to maximise benefits to local communities and biodiversity also presented considerable challenges (for consideration of such issues, see e.g. Pattullo 1996; Tapper 2006). The value of up-scaling and mainstreaming conservation objectives was also acknowledged, although it was recognised that this approach often appeared easier in principle than in practice.

## References

- Adams, W.M. 2006. *The Future of Sustainability: Re-thinking Environment and Development in the Twenty-first Century*. IUCN [The World Conservation Union] Report: [http://www.iucn.org/members/future\\_sustainability/docs/iucn\\_future\\_of\\_sustainability.pdf](http://www.iucn.org/members/future_sustainability/docs/iucn_future_of_sustainability.pdf)
- CBD [Convention on Biological Diversity] 2002. *Biodiversity and Sustainable Development*. CBD News Supplement. Secretariat of the Convention on Biological Diversity, Montreal: <http://www.cbd.int/doc/newsletters/news-sd-supplement-en.pdf>
- Pattullo, P. 1996. *Last Resorts: The Cost of Tourism in the Caribbean*. Cassell, London.
- Pound, B., Snapp, S., McDougall, C. & Braun, A. 2003. *Managing Natural Resources for Sustainable Livelihoods: Uniting Science and Participation*. Earthscan Publications Ltd, London.
- Sneddon, C.S. 2000. 'Sustainability' in ecological economics, ecology and livelihoods: a review. *Progress in Human Geography* 24: 521-549.
- Tapper, R. 2006. *Wildlife Watching and Tourism: a study of the benefits and risks of a fast growing tourism activity and its impacts on species*. United Nations Environment Programme/Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals, Bonn.
- WCED [World Commission on Environment and Development] 1987. *Our Common Future*. Oxford University Press, Oxford.

# Managing the impact of tourism: lessons from South Georgia

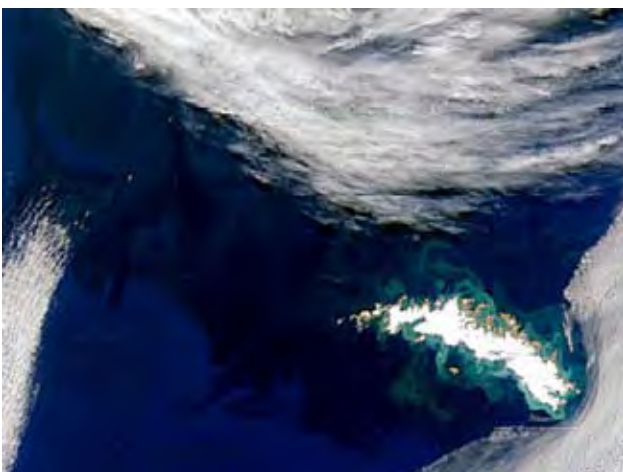
**Gordon M. Liddle, Operations Manager, Government of South Georgia and the South Sandwich Islands**



Liddle, G.M. 2007. Managing the impact of tourism: lessons from South Georgia. pp 150-153 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

It is vital to have environmental baseline knowledge in order to evaluate tourist impact. This should ideally be carried out prior to the industry beginning, but can be done at any time to measure continued or changing impacts. Monitoring is then necessary to detect environmental changes. From there, one needs a process of data gathering on who is doing what and where in order that the managers can see the true cause of any changes detected. This is, we think, best done by a post-visit reporting procedure informing our tourism database. All visitors must have a permit to visit. Active management of sites of tourism is, of course, necessary and can vary enormously depending on the type of tourism and the sensitivity of the sites. Thus, individual site management plans can (and should) be created to ensure that what the visitors come to see they do not damage. All of this can work only if it is done in partnership with the tourism industry. It is one thing to try to impose regulations, but far better if the industry buys in to the process and (in effect) becomes self-regulating, as they see the economic benefits to themselves in so doing. This process is cemented by a process of education for the visitors themselves, which allows them to understand that they are valued and a positive contribution to conservation, and not just a source of general revenue. Many also are concerned about their own impact and want to be reassured that sufficient protection is in place to ensure that they are not adversely affecting the environment. It is important also to remember biosecurity.

**Gordon M. Liddle, Operations Manager, Government of South Georgia and the South Sandwich Islands, Government House, Stanley, Falkland Islands**






South Georgia Island
online environmental resource

welcome
history nature visitors images gamezone explore government

[The Island](#)  
[News and Events](#)  
[South Georgia Museum](#)  
[References](#)  
[Links](#)







## Welcome to South Georgia

Stunningly beautiful and rugged, this island wildlife sanctuary, once visited, is not easily forgotten. Its majestic grandeur of snow covered peaks, blue glacier ice and emerald green bays, is a breathtaking sight.

South Georgia is an "Antarctic Oasis" in the cruel and stormy southern oceans and is home to thousands of penguins, sea and land birds, seals and reindeer.

Sir Ernest Shackleton lies buried in the little cemetery at Grytviken. Abandoned whaling stations rusting and rotting are a reminder South Georgia was the whaling capital of the south.





## Whaling arrives

On 16 November 1904, a Norwegian, C A Larsen, with experience of whaling in Arctic waters, established the first whaling enterprise on South Georgia at Grytviken. Larsen's enterprise was commercially very successful. Oil and by-products from one whale could fetch £2,500. His company returned a 70% dividend in its first year of trading. Huge interest in obtaining whaling licences followed. Restrictions on their issue and conditions, such as that the complete whale was to be processed, not just the blubber, were measures to try to sustain the industry. Initially only blubber was taken and the carcass discarded, resulting in beaches of bones along the coast line.

Whaling stations were established  
By 1912, seven whaling stations had been  
established.



1904 to 1965, Grytviken was operated by Compañia Argentina de Pesca to 1959 then by Albion Star and sub leased to Gyogyo Kabushiki Ltd of Japan for its last two seasons.



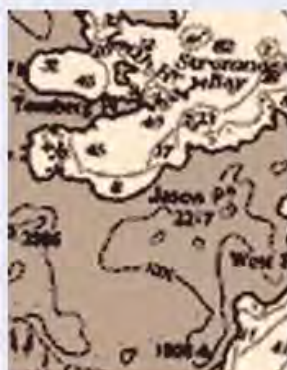
1907 to 1961, Stromness was initially a harbour for a moored floating factory, a shore station was built in 1912. Sandefjord Whaling Co., the Southern Whaling and Sealing Co. and Vestfold Whaling Co. operated the station to 1931. It then became a ship repair yard having been purchased by the South Georgia Company of Leith.



*Nigel banner made a record of life in the Whaling era, and in this shot-*



Grytøyken  
Northwestern Bay  
Strömness  
Northeastern Bay  
Vills Island  
Bird Island  
Cape Paradysie  
Annekov Island  
Greene Peninsula  
Island Graveyards



## Explore South Georgia

We have prepared a series of pages that take you around the island in words and pictures. We have also made a series of moving panoramas that were taken at some of the islands most beautiful locations.

To explore the island property - you will need to have the latest Flash5 plug-in installed. This comes as standard with most browsers, but you might require a download/upgrade in order to view this feature. You will automatically be re-directed to the Macromedia site if this is necessary.

click below to launch...





# Building the TCI Biodiversity Management Plan with the local community and putting it into practice: surveying biodiversity, designing trails, recruiting guides, encouraging crafts

**Bryan Naqqi Manco, Senior Conservation Officer, Turks & Caicos National Trust**



Manco, B.N. 2007. Building the TCI Biodiversity Management Plan with the local community and putting it into practice: surveying biodiversity, designing trails, recruiting guides, encouraging crafts. pp 154-168 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The *Plan for Sustainable Development and Biodiversity Management around Turks & Caicos Ramsar Site* was published and presented for public and government circulation in 2002. The Plan presents new information found during biodiversity surveys, and includes recommendations for future research, sustainable livelihoods and development on North, Middle, and East Caicos as well as other islands.

Biodiversity research provides data for protected areas management, support for the development of conservation guidelines and legislation, and material for education. National Trust field staff, TCI Government workers, and high school students are given opportunities to gain hands-on experience during field research conducted by specialists. Research outputs are incorporated into the Plan, publications for the general public, and the national curriculum.

Several projects have been involved in implementing major aspects of the recommendations in the Plan. These were resourced by a combination of local support, the work of international partners, and the UK Foreign & Commonwealth Office and Department for International Development, most recently through their joint Overseas Territories Environment Programme (OTEP). For example, the Field-roads Project upgraded 14 traditional routes into fully interpreted hiking trails, highlighting endemic plants and animals, plants of important cultural use, and historic sites in different habitats. Numbered cairns mark points of interest along the field-roads, and full-colour laminated Field-road Guide Cards, keyed to the numbered markers, provide site interpretation. Guide Cards are sold to visitors, providing maintenance funding for the field-roads.

Encouragement and training of tour guides and National Trust field staff has enhanced local capacity for sustainable development and environmental stewardship. Workshops have built better understanding between the National Trust and the tour guides, and have encouraged the local residents to take ownership of their resources for ecotourism. Support for traditional cultural crafts, protection of natural material harvest locations, and small business workshops have created a growing local craft industry. Product enhancement and development workshops led by the National Trust have improved product quality and encouraged individual specialities.



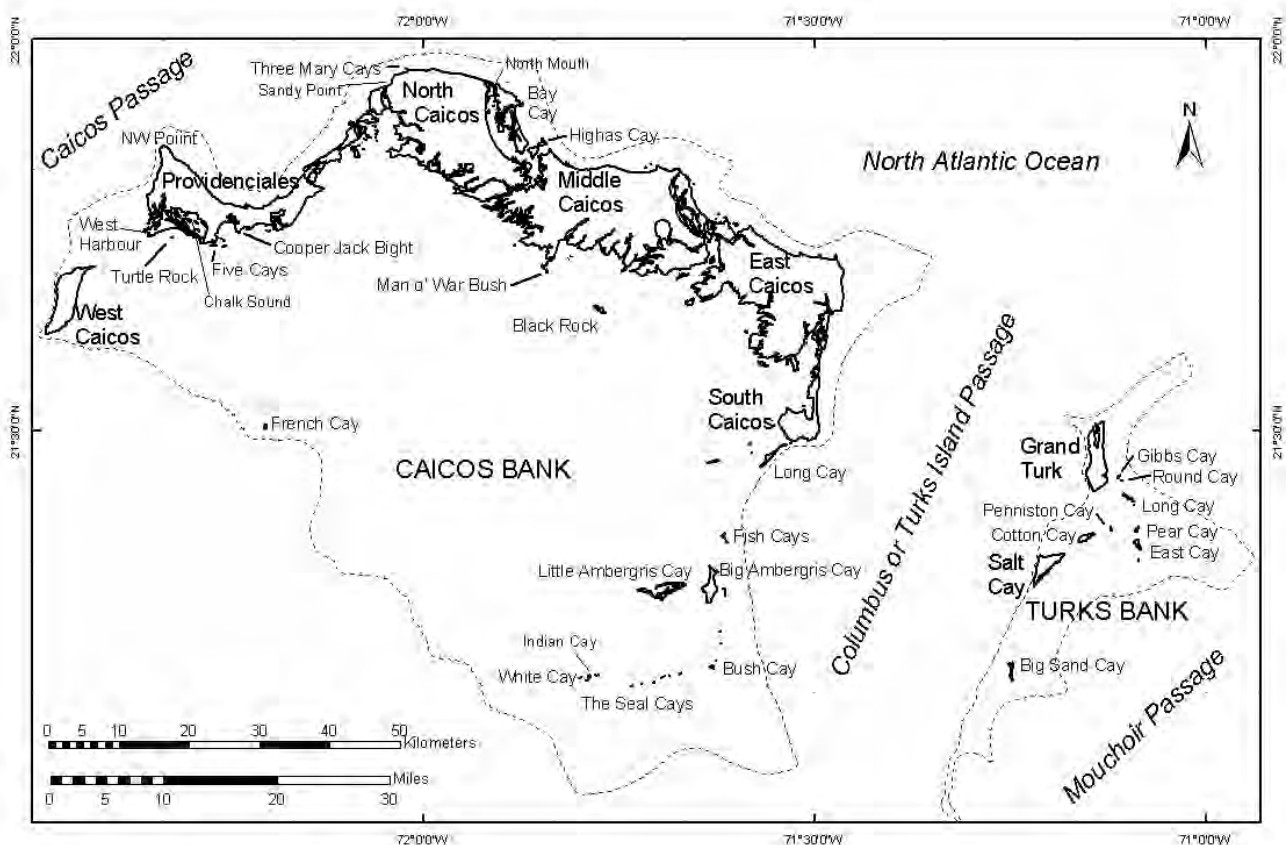
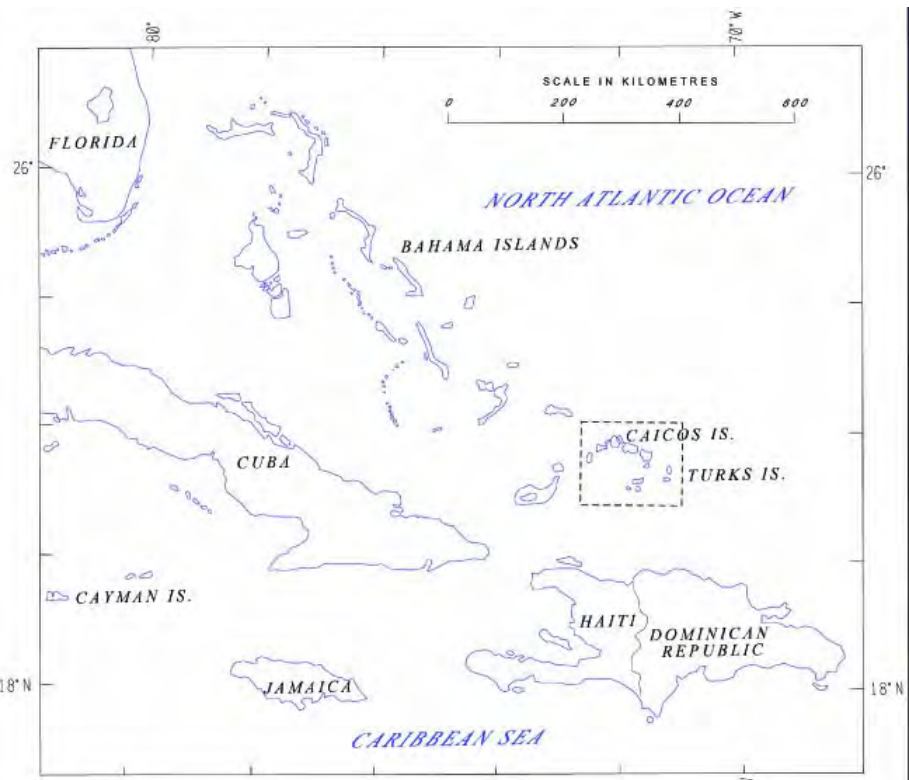
Development of a former school building on Middle Caicos has created a base of operations for biodiversity research, field-road management, capacity building and training, and environmental education. The Middle Caicos Conservation Centre will officially open in November 2006, and will feature an exhibit hall, National Trust office, research laboratory and accommodation for visiting specialists. The Conservation Centre, an idea originally proposed in 1998, represents concrete and successful implementation of the Plan for Sustainable Development and Biodiversity Management around Turks & Caicos Ramsar Site.



## Introduction

This is the location of the Turks & Caicos Islands (TCI), a UK Overseas Territory which is geographically part of the Bahamian Archipelago but politically separate from the Bahamas.

TCI comprises 9 (soon to be several more) inhabited islands, as well as over 100 other islands, cays, and rocks. These are divided into two groups, those of the Turks Bank to the east, and those of the Caicos Bank to the west. All are low-lying islands, formed principally of limestone.

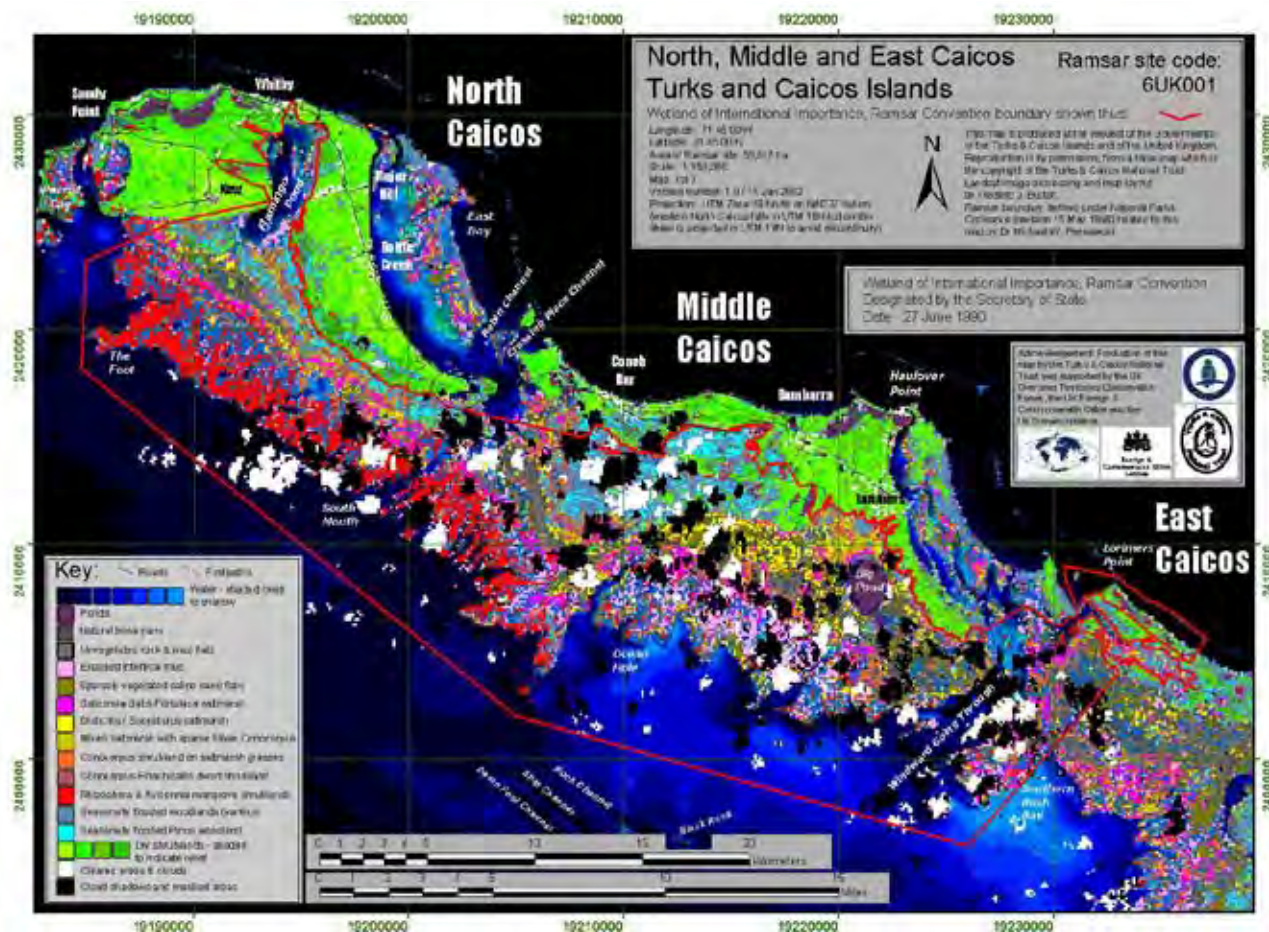




## The Plan for Sustainable Development and Biodiversity Management around Turks & Caicos Ramsar Site

and Biodiversity Management around Turks & Caicos Ramsar Site. The Plan was published and presented for public and government circulation in 2002.

The Turks & Caicos National Trust, the UK Overseas Territories Conservation Forum and other members of UKOTCF, including CABI Bioscience, worked with the local community and volunteer biodiversity specialists for several years to produce the *Plan for Sustainable Development*





The *Plan* includes geo-environmental, natural, cultural, and historic baseline data on the Turks & Caicos Islands, the Ramsar Site and surrounding areas. Much of the information, particularly in relation to biodiversity, was newly collected. A habitat map (previous page) showing distribution of different vegetation types was constructed by analysis of satellite imagery and ground-truthing studies.

The three main islands covered by the Plan differ in their degree of disturbance of natural habitats. North Caicos is an agricultural island, rapidly moving towards built development. It is approximately 45 square miles with a population of around 2500. Middle Caicos is a largely undeveloped island, approximately 50 square miles with a population of about 275. East Caicos is the largest uninhabited island in the Caribbean and, like the others, is now under pressure for large-scale development.

The Plan was moulded through collaborations with the Middle Caicos community in particular. Frequent community meetings like those in the photographs above solicited valuable guidance for the project from local people, and ensured that their interests were central to the Plan.

As well as baseline information, the *Plan* includes recommendations for future research, environmental management and sustainable development for North, Middle, and East Caicos as well as other islands. Sustainable livelihoods are a particular focus for the inhabited islands.

## Biodiversity Research

The biodiversity research conducted under this project has provided valuable baseline data. This informs protected areas management, the development of conservation guidelines and legislation, provides material for education and popular publications, and contributes to regional and worldwide scientific study.

Five major taxa have been considered in the project's biodiversity research: plants, insects (particularly butterflies), reptiles, birds, and bats.

Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, page 157



*Bee-mimic Fly on Peas n' Rice bush Melochia tomentosa*



*Heather Limonium bahamense, endemic to TCI*





*Endemic Pygmy Boa* *Tropidophis greenwayi*, the smallest constrictor snake in the world (left), and its main prey, the endemic Dwarf Gecko *Sphaerodactylus caicosensis*



*January 2005 research team at Wild Cow Run, Middle Caicos: launch point for East Caicos expeditions*

Other taxa are also considered where specialist expertise is available.

Recent research sessions under the project have included fieldwork in January 2005 which focused on East Caicos, and was the first biological study of the Caribbean's largest uninhabited island in nearly 70 years. As well as work on the plant and animal groups listed above, research included cave exploration and mapping, and survey of sea turtle nesting beaches.

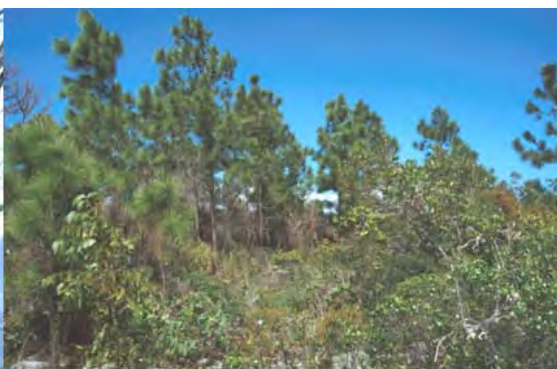


*Redman's Long-tongue Flower Bat* *Monophyllus redmani* (left) and *Waterhouse's Big-Eared Bat* *Macrotus waterhousii*



*Cape Comete Hill Cave, East Caicos*





Pine scale research  
*Pinus caribaea* var *bahamensis*



Fieldwork in March-April 2006 co-ordinated by Royal Botanic Gardens (RBG) Kew focused on herbarium collections of endemic plant species, botanical field training, and survey of the introduced scale insect which is killing the national tree *Pinus caribaea* var. *bahamensis* (see above for pictures of earlier, healthy forest, current damaged forest and detail; see also Hamilton, this volume).

Fieldwork in April 2006 (below) collected 14 new species for RBG Kew's Millennium Seed Bank, and launched an on-going collection programme with plans for further international training.

Specialists leading the biodiversity studies have been recruited from top-class institutions, which have donated their staff time to the project. Independent specialists have generously contributed in a voluntary capacity. Research sessions have provided training opportunities as well as collecting data. National Trust field staff and TCI Government workers are invited to participate in the field research, thus gaining hands-on experience. High school students have also been actively involved in field activities.

Data collected during research sessions has been incorporated into the Plan, which additional information from on-going activities will be used to refine. Information from specialists' reports is also incorporated into publications for the general public, and into the National Trust's children's publications and ultimately the national curriculum. The information gathered during research sessions also underpins the interpretation material which has been developed for protected areas and ecotourism sites.







*Above: British West Indies Collegiate and Department of Environment & Coastal Resources personnel participate in training in the use of dichotomous keys by an exercise in identifying the specialist scientists that they had just met at the start of the training.*

*Right: TCNT Education Officer leads a field trip on Silver Buttonwood Field-road based on Biodiversity Management research*



*High school students receiving training from visiting specialists, Stubbs Guano Cave 1, East Caicos, January 2005*



## Field-roads

“Field-road” is a local Caicos Islands term describing a footpath through the bush, used to access agricultural areas, ponds, wells, or other important sites. The Field-roads Project upgraded traditional field-roads into fully interpreted hiking trails for ecotourism and environmental education, and implemented major aspects of the recommendations in the *Plan*. Field-roads range from short, easy walks to all-day adventure hikes and for most, the National Trust



Opening, widening,  
and trail bed clearing...







*Far left: Lorimers Village Field-road, before widening & trail bed work*

*Near left: Wade's Green Plantation 1: Entryway and Town, completed to Field-road Project specifications for short field-roads. Different standards apply to adventure hike field-roads.*

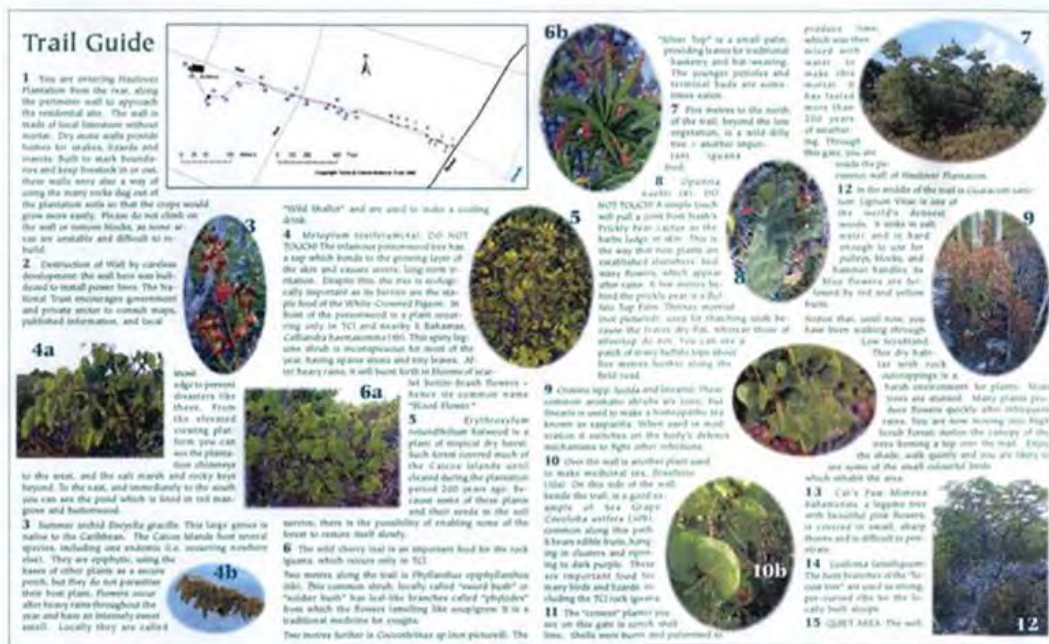
recommends a local guide for safety. Traditional limestone cairns, with plastic laminate engraved numbers, mark points of interest along the field-roads. Full-colour Guide Cards, keyed to the numbered markers, provide full site interpretation, including a map (based on aerial photos when available), along with trail conditions and area history or special interest information. Guide Cards are sold to serve as tickets to the field-road, providing funding for maintenance of the path and acting as a souvenir for visitors.

Each field-road highlights endemic plants and animals, plants of important cultural use, and historic and cultural features of interest. The field-roads cover a range of different habitat types, and pass through (or by) a number of important historic sites. The first field-roads to open were Haulover Plantation and Crossing Place Trail Part 1 on Middle Caicos in June 2004. A further 11 field-roads have been created on Middle, North, and East Caicos in subsequent years. Some, such as the two at Wade's Green Plantation (North Caicos),

**Traditional stone cairns with markers attached with epoxy**



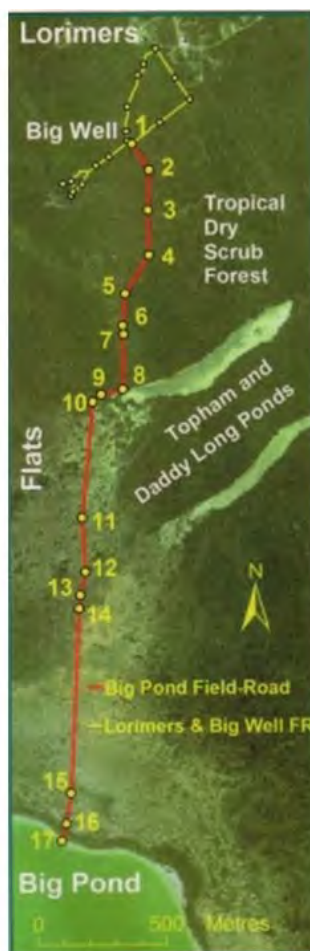
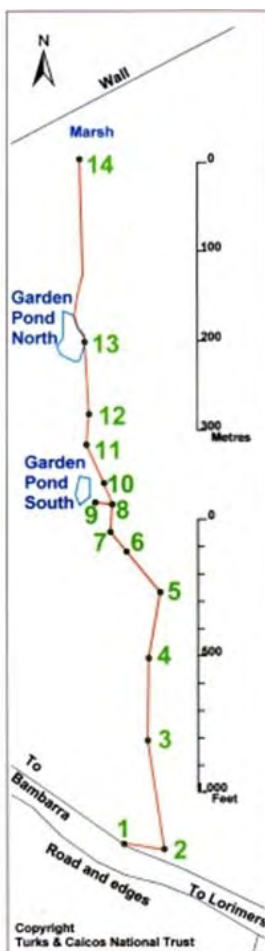




## Turks & Caicos National Trust Field-road Guide Cards, cover and inside page.

Left: Garden Pond Field-road as an example of a line map; and Big Pond Field-road: as an example of an aerial photo-based map.

Below: Field-road card in use at Wade's Green Plantation Field-road 2: Well and Dry Tropical Forest







*Left: Students use a field-road card to follow Crossing Place Trail 1, Middle Caicos. Below: Turks & Caicos endemic Curly-tail Lizard or “Bugwally” *Leiocephalus psammodromus*, one of several endemic species and sub-species likely to be seen on the field-roads*



and those at Cheshire Hall Plantation and Little Water Cay (Providenciales) have already become popular tourist sites.

The Field-roads Project was funded primarily by the UK Foreign & Commonwealth Office (FCO) and most recently by the joint FCO/Department for International Development (DFID) Overseas Territories Environment Programme (OTEP), together with major volunteer specialist input from UKOTCF throughout.

### Sustainable livelihoods

Encouragement and training of tour guides and National Trust field staff has enhanced local capacity for sustainable development and environmental stewardship. A series of workshops and one-on-one meetings with local tour guides have proven valuable in furnishing understanding between the National Trust and the guides. The National Trust receives reports from tour guides on any unusual activity or occurrences in and around the ecotourism sites. The National Trust’s implementation of the Plan’s recommendations for management of Conch Bar Caves National Park on Middle Caicos has been particularly successful in establishing a sense of cooperative stewardship with the local guides. Training sessions for guides include guidance on customer service and business management, and draw on biodiversity data from the field research (with advice from specialists) as

*Left above: Visitors on the field-road at Little Water Cay, famous as the site where visitors are guaranteed to see the endemic Rock Iguana (below) and their visitor fees help cover the cost of managing the reserve.*







*Guide training certificate for first two opened field-roads*



*Conch Bar Caves National Park: an important ecotourism destination managed by Turks & Caicos National Trust*



## Tourism-supported local businesses and traditions



*Left: Caicos sloop builder Headley Forbes at Bambarra Settlement, Middle Caicos; Middle: crab hunter Dion Outten (with *Cardisoma guanhumi*) at Kew Settlement, North Caicos; Right: Alton Higgs, bush doctor at Lorimers Settlement, Middle Caicos*

needed. The ecotourism industry in Middle Caicos is steadily expanding and the National Trust's workshops and training sessions have encouraged the local residents to take ownership of their resources for ecotourism.

Small business workshops conducted by the National Trust also encourage other businesses that can profit from the field-road tourism infrastructure, such as bed & breakfast and room rental, restaurants and catering, crafts, taxis, and bike and car rental.

### Support for traditional cultural crafts and local small business

Support for traditional cultural crafts, protection of locations where natural materials are harvested, and small business workshops have nurtured a growing local craft industry. The increasing

ecotourism activity provides a local market for traditional craft products. The National Trust also sells traditional crafts on behalf of artisans in three locations on the tourism-dominated island of



*Artisans' Small Business Enhancement Workshop at Bottle Creek Settlement, North Caicos - organised and run by Turks & Caicos National Trust*





*Tattyland Down Pond, North Caicos, a traditional harvest area for “dawn” *Typha domingensis**



*Big Top Palm Sabal palmetto used in traditional crafts*



**Local crafts: straw hats & bags, “fanner-grass” baskets, toy boats, straw dolls...**

Providenciales (photo above), and supplies several other retailers as well.

Workshops with traditional artisans revealed their concerns about coastal development that threatened harvest areas for craft materials. The National Trust worked with the Department of Planning to redesign a subdivision that threatened Tattyland Dawn Pond. The National Trust continues to pursue land protection for coastal and wetlands areas with populations of plants used in traditional crafts. Product enhancement and development workshops led by the National Trust

have improved product quality and encouraged individual specialities.

### **Middle Caicos Conservation Centre**

Development of a building on Middle Caicos has created a base of operations for biodiversity research, field-road management, capacity building and training, and environmental education. The Middle Caicos Conservation Centre (MCCC) will officially open in November 2006, having been converted from a disused primary school with grant monies from the Turks & Caicos





## Middle Caicos Conservation Centre Bambarra Settlement, Middle Caicos



MCCC building before (top right) and after (bottom) reconstruction, and interior under construction (top left)

Government's Conservation Fund, OTEP and several private benefactors, and UKOTCF volunteers.

The Conservation Centre's exhibit hall showcases exhibits explaining the natural, cultural, and historical heritage of Middle, North, and East Caicos, including artefact displays and live exhibits. The Conservation Centre's office



Examples of exhibit panels: above: label for live exhibit of Caicos Barking Gecko *Aristelliger hechti*;  
right: Lucayans;  
following page: endemic animals and plants





# Endemic Animals and Plants of the Turks & Caicos



Animals and plants endemic to a certain area occur naturally only in that particular area. The Caribbean is considered to be a "Biodiversity Hot-Spot" due to the vast numbers of unique species in the region. There are species and sub-species endemic to the Caribbean region; others endemic to the Southern Bahamas Archipelago (including TCI), and still others endemic only to the Turks & Caicos Islands. Those species and sub-species found only in the Turks & Caicos Islands are special and unique to this country, and are found nowhere else on earth. Therefore we have a special responsibility to protect them.

## Our National Flower

The National Flower of the Turks & Caicos Islands is the Turks & Caicos Heather *Limnium bahamense*. Its species name refers to it being native to the Bahamas; it was named in 1887 when the Turks & Caicos were politically part of the Bahamas. Botanical nomenclature disallows changing of formal (Latin) species names but the plant is indeed restricted to only the Turks & Caicos Islands and does not occur in the Bahamas. The picture shows a tiny Pygmy Blue butterfly *Brachidium exilis* (about 1cm across) feeding on the flowers' nectar.



## Extremely Limited Range

A case of extreme endemism, the Ambergris Cay Buttonwood *Borreria opillaris* lives only on Big and Little Ambergris Cays and, in very small numbers, on a few of the other Caicos Islands. With such a limited world range, this plant could easily become extinct if not protected. Luckily, the Turks & Caicos National Trust owns Little Ambergris Cay and that population of the species is forever protected.



Below: Grounds of MCCC, with the main building at left.  
Right: Aerial view and yard, with main building at bottom left of the grounds outlined in blue







serves as a base of operations for the National Trust in Middle Caicos, and the Centre also has a research laboratory for field research and can provide accommodation for visiting specialists.

Future plans for the Centre include outdoor exhibits and botanical displays in the large yard. The Conservation Centre, an idea originally proposed in 1998, represents a concrete and successful example of implementation of the *Plan for Sustainable Development and Biodiversity Management around Turks & Caicos Ramsar Site*.

# Environmental considerations in the planning of an airport for St Helena: getting the balance right

**Dick Beales, Senior Natural Resources & Environment Adviser DFID (prepared with Isabel Peters, Environmental Co-ordinator, St Helena Government)**



Beales, R.W. & Peters, I. 2007. Environmental considerations in the planning of an airport for St Helena: getting the balance right. pp 169-177 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The decision by the St Helena and UK governments in March 2005 to build an airport at St Helena, allowing air access for the first time, is expected to bring long-term economic and social benefits to the island that would not be realised by a continuation of current arrangements for access only by sea. The prospects for the island's sustainable economic regeneration and ultimate financial self-sufficiency are expected to be enhanced largely through the development of tourism.

Among the principal attractions of St Helena as a tourist destination are its unique environmental assets and natural resources. The construction of the airport and the development of a tourism-based economy that air access is expected to stimulate, will not only carry risks but also offer opportunities to create benefits for the environment. The risks associated directly with the construction of the airport and supporting infrastructure can be assessed, and will be managed. Potential environmental benefits are emerging as a result of the sharpened focus on environmental issues that the project has brought about. It is not yet possible, however, in the absence of any firm commercial proposals, to assess the possible wider environmental and social effects of generated development, including that in the tourism sector, other than in general terms.

Topographical constraints have dictated that the runway be located on the eastern edge of Prosperous Bay Plain, an environmentally sensitive area containing a unique assemblage of endemic invertebrates and a range of indigenous and endemic plant species. It is also an important habitat (among others on the island) for part of the small and declining population of the endemic St Helena Wirebird *Charadrius sanctae-helena*.

This presentation describes how environmental considerations have been taken into account through a phased process of environmental impact assessment linked to scheme design and the procurement of a contract for its delivery. It also describes how a balance has had to be struck between the economic and social imperative of air access development and the protection (and enhancement where possible) of St Helena's precious environmental assets on which the quality of life for its residents, and its economic future, largely depend.

**Dick Beales**, Senior Natural Resources & Environment Adviser, Overseas Territories Department, Department for International Development, 1 Palace Street, London, SW1E 5HE, UK R-Beales@dfid.gov.uk;

**Isabel Peters**, Environmental Co-ordinator, Environment Planning and Development Section, Development and Economic Planning Department, 1 Main Street, Jamestown, St Helena Island, STHL 1ZZ isabel@sainthelena.gov.sh





*Test flight over St Helena*

Although Isabel Peters is associated with this presentation, she was unable to attend the conference for the reasons that underpin this issue, i.e. St Helena's isolation and infrequent ship voyages.

In giving the presentation, Dick Beales spoke from his perspective as natural resources and environment adviser to the St Helena Access Team of the Department for International Development's (DFID) Overseas Territories Department.

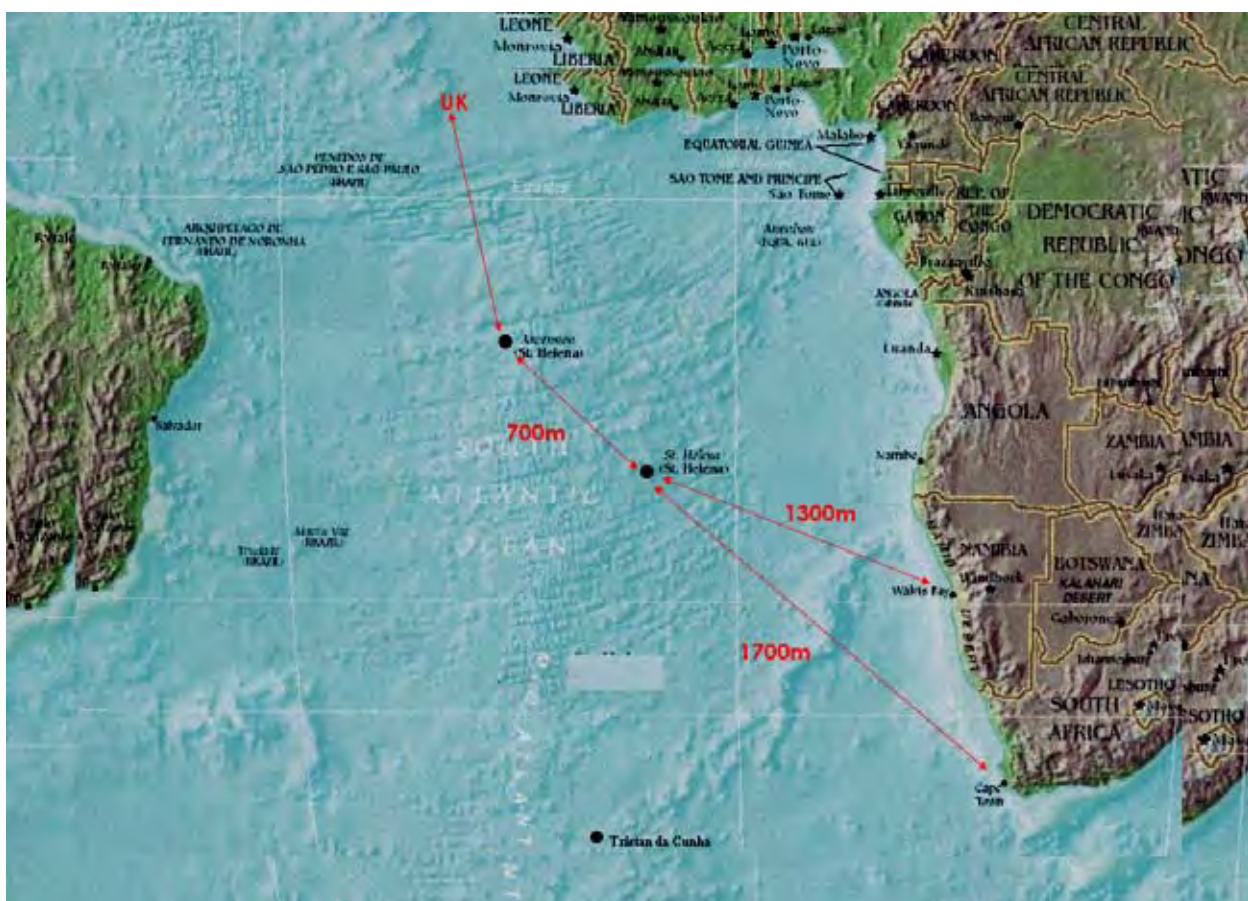
Although the project is a highly complex one, time constraints on this presentation will allow only a somewhat superficial treatment. It is intended,

therefore, given the focus of the Conference, to highlight two particular biodiversity issues.

The background to the access project is in the abstract above, but it is worth highlighting some 'givens' at the outset.

### Starting points

- Air access is a social and economic imperative for the island;
- Economic regeneration and future financial sustainability are likely to lie in tourism development;
- The environment constitutes a large part of the tourism product;
- A political decision to build an airport has been taken by St Helena Government (SHG) and DFID (March 2005);
- Approval by DFID Ministers was conditional on a rigorous Environmental Impact Assessment (EIA) being undertaken;
- There is only one possible site on the island for a runway of the required length;
- There will be direct environmental impacts but these can be managed;
- There are opportunities to create environmental benefits;
- Air access has been on the island's agenda for a







*RMS St Helena*

- long time (probably since 1947)
- St Helena is a much-studied island – a lot of knowledge exists
- It is not a pristine environment, having been constantly modified by human activity since the 16th Century.

## St Helena

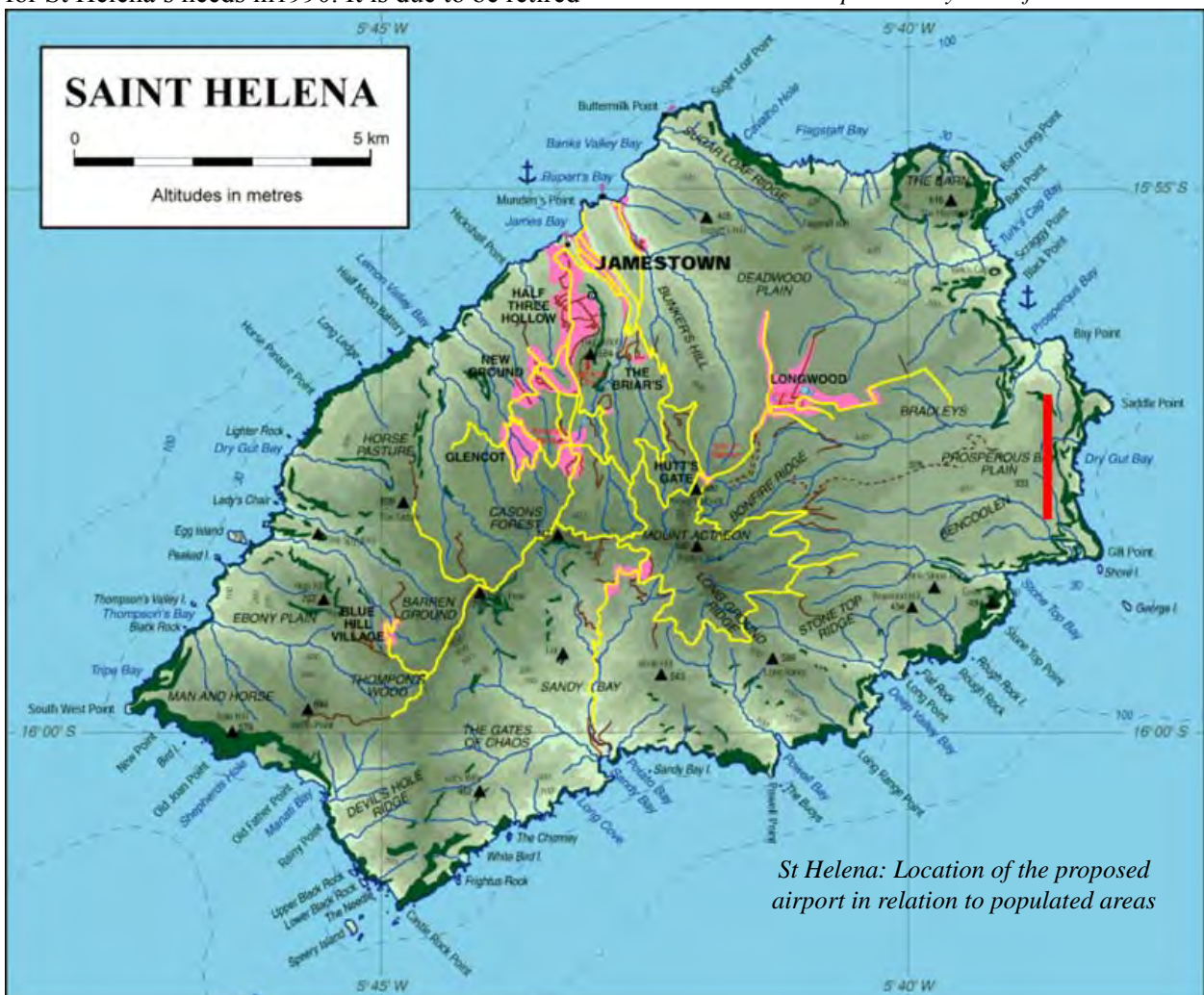
St Helena has a mid-ocean location (see map on previous page). Access is only by sea. The current - and probably the last - *RMS St Helena* (above) is a specialised cargo-passenger ship built specifically for St Helena's needs in 1990. It is due to be retired

around 2010. It has provided a subsidised service. However, this cannot form the basis of economic regeneration and financial sustainability.

At 122 km<sup>2</sup> (approximately 17 x 10 km), St Helena is roughly the same area as Jersey. The highest point is 825m above sea level (ASL). It has a population of about 4000, down from 5500 ten years ago. The main settlements are shown in pink on the map below, with the road network in yellow. The planned runway location at Prosperous Bay Plain is shown in red.



*View towards Prosperous Bay Plain from the Peaks*



*St Helena: Location of the proposed airport in relation to populated areas*





## Main components of the project

The photograph on the previous page looks northeast to the airport site at Prosperous Bay Plain, from the Peaks in the centre of the island. The Plain is at approximately 300m ASL, with cliffs to the north, east and south.

The total runway length will be 2250m. Although the Plain looks reasonably level, approximately 8 million cubic metres of rock will need to be shifted for an embankment in Dry Gut (near the southern end of the runway) to enable the full length to be realised.

The satellite image above shows the location of the key features of the project. Possible landing points for plant and construction materials are at Rupert's Bay (1) and Prosperous Bay (6). There are strong economic, technical and developmental reasons, and some environmental ones, for favouring the former. For example, it would enable the bulk fuel installation at Rupert's Bay to be moved away from the residential area, producing health and safety benefits. The haul route from the coast at Rupert's Bay would most likely follow the route from Deadwood Plain to Bottom Woods (2). While a route through Fisher's Valley (3) might be preferable in terms of Wirebird conservation, it would impinge on a proposed Wetland of International Importance under the Ramsar

Convention. In the event, this option proved not technically feasible. The airport runway (4) and terminal complex (5) are shown lying to the east of the central basin (the pale-coloured area) of Prosperous Bay Plain.

Other important elements of the airport project include:

- Inshore sea rescue
- Fire and rescue services
- Remote obstacle lighting – power/access issues
- Meteorological station – power/access issues
- Security fencing.

## Key environmental issues

We will focus on two areas: Deadwood Plain and Prosperous Bay Plain. There are environmental



*St Helena Plover or Wirebird Charadrius sanctaehelenae*  
(Image courtesy Mike and Ann Pienkowski)





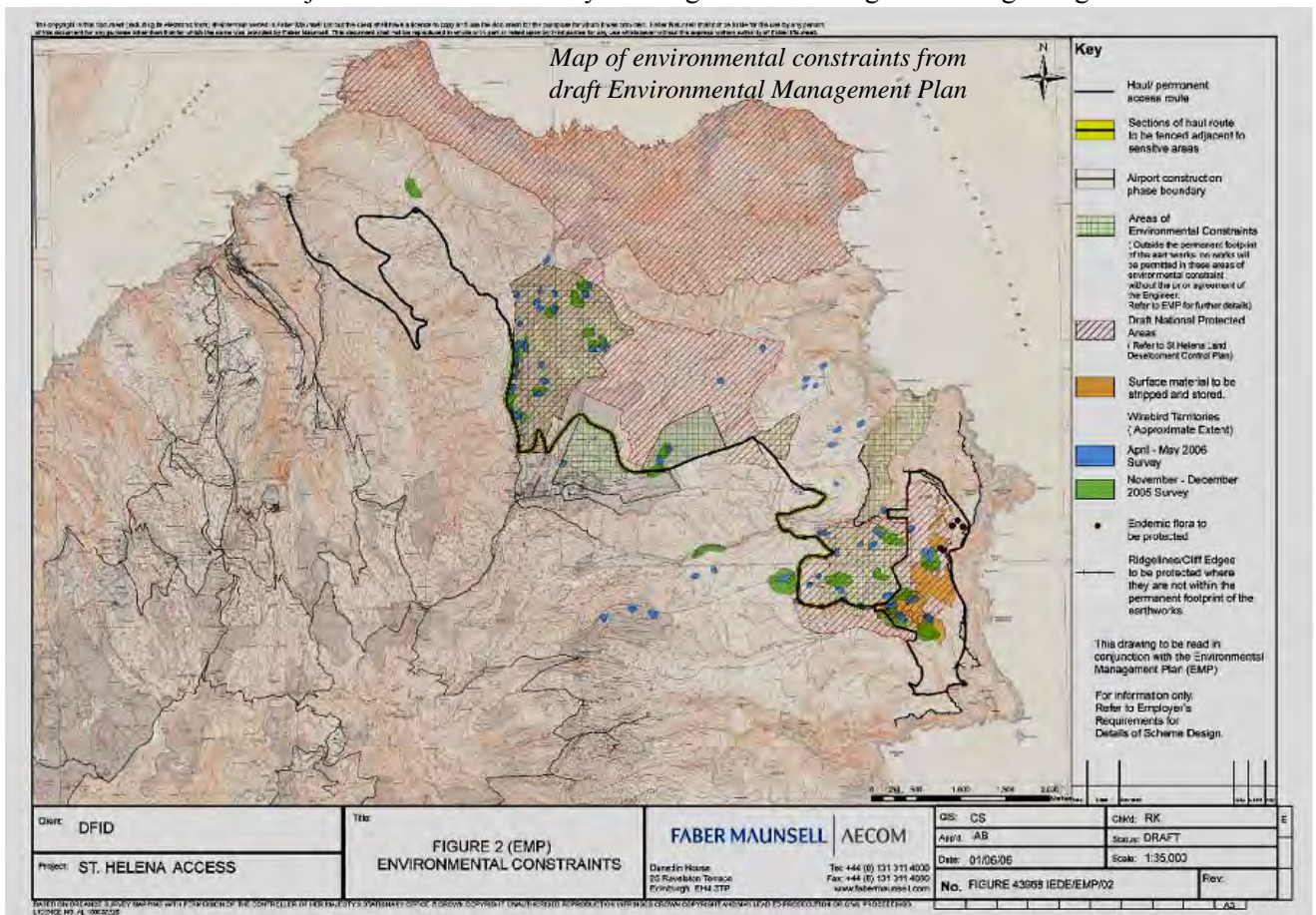
Central Basin

View across the central basin of Prosperous Bay Plain

headaches here, but also opportunities for creating environmental benefits.

Deadwood Plain and adjacent areas are critically

important habitat for the Wirebird. The population of about 220 adults shows a 43% decline over the past 5 years. This is considered to be due to habitat degradation through reduced grazing and invasive



plants, as well as to predation by feral cats and, possibly, mynas.

Prosperous Bay Plain is unprotected. The studies by the Ashmoles and the airport project have focused attention on the need for protection.

Philip and Myrtle Ashmole's work has confirmed the central basin of Prosperous Bay Plain as a hotspot of invertebrate endemism (notably of spiders), with more than 20 endemic species.

It is also an important habitat (among others on the island) for the endemic Wirebird, and for several species of indigenous and endemic plants. A survey of lichens by a Dutch specialist is taking place as we speak.

The airport project offers an opportunity to bring about a long-term beneficial effect, by arresting the gradual decline on a habitat whose global biodiversity significance has only recently been fully appreciated.

There are a number of environmental constraints to be taken into account in project planning. The airport itself will have a footprint of approximately 100 ha. The map on the previous page shows (in green crosshatch) areas of particular environmental constraints, particularly Deadwood Plain and Prosperous Bay Plain.

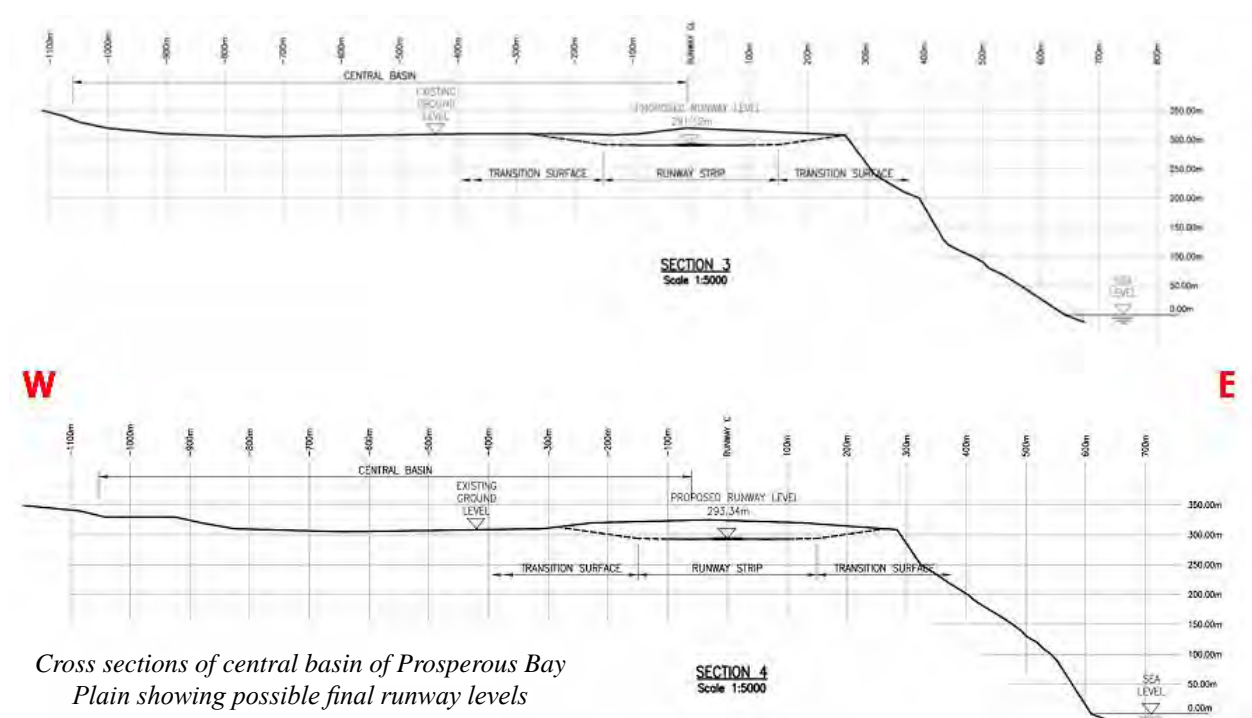
Wirebird territories are shown in blue (April-May 2006 survey) and green (November-December

2005 survey), resulting from the updating study commissioned by DFID from Neil McCulloch through RSPB. The sensitivity of Deadwood Plain (along the west side of which the access route runs) and the Prosperous Bay Plain area are clear.

An OTEP-funded project is helping to formulate a species action plan, involving work with RSPB, St Helena National Trust (SHNT), the St Helena Government's Agriculture and Natural Resources Department (ANRD) and others. The Air Access project will support habitat restoration elsewhere in compensation for habitat lost at Prosperous Bay Plain.

As noted above, the central basin of Prosperous Bay Plain was identified by the Ashmoles and others as an invertebrate biodiversity hotspot. Their work has already contributed to the outline design by, for example, influencing the location of the terminal. The airport works will involve the loss of 15-20% of the habitat of the central basin but it is expected that the remaining area will be afforded greater protection than it has at present. There will, however, be a change in topography, with the loss of some of the upwind protective ridge to east, which may affect the micro-climate of this desert.

The west-east sections across central basin and runway below show the lowering of the eastern part of the central basin and the ridge to the east. This will lower the level of the runway and its surrounds, in order to provide a balance of cut material along the runway sufficient to fill Dry Gut.







*Deadwood Plain looking north*

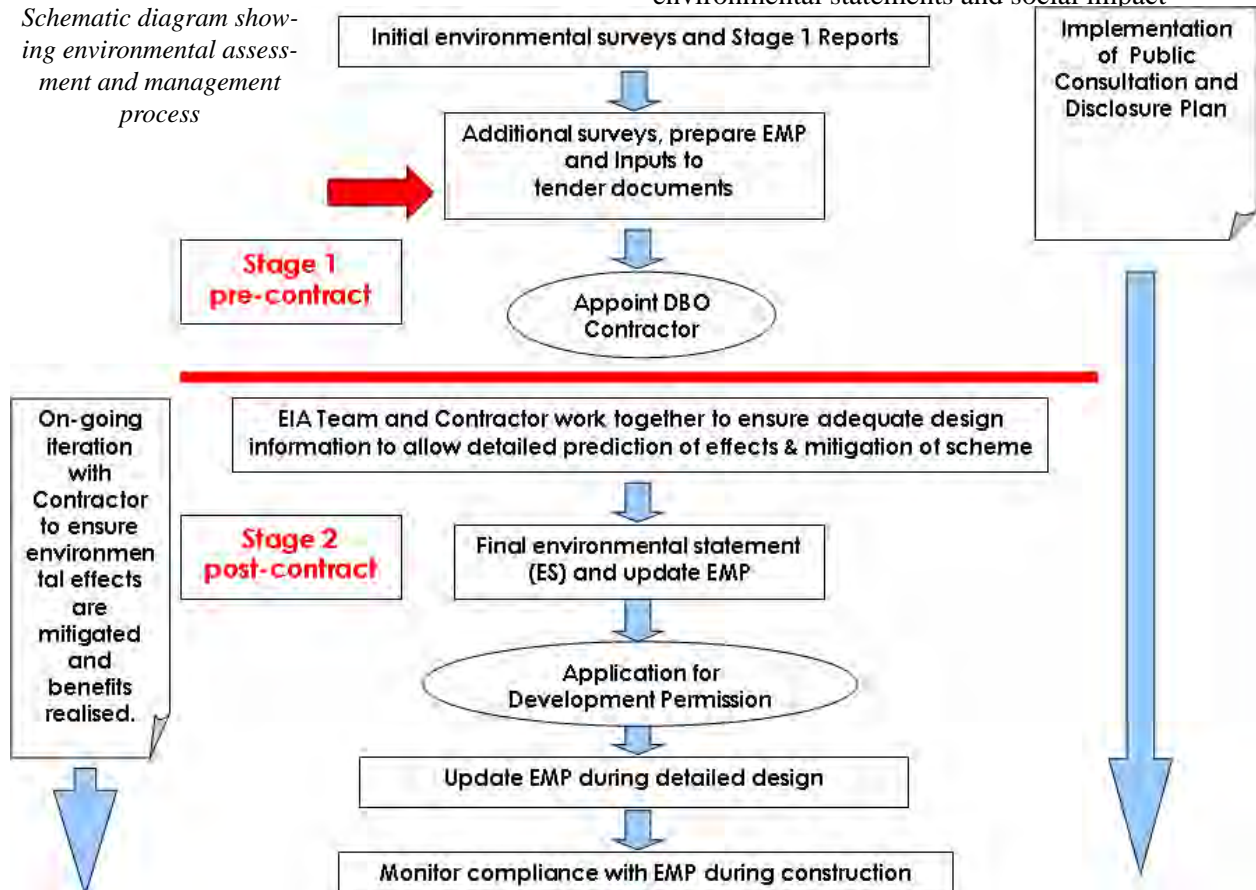
The runway edges need to slope at 7% to meet the safety requirements of the airport regulator.

The final level of the runway surface cannot be determined until detailed design takes place. In the meantime there remains some uncertainty about likely future conditions in the central basin. Wind effect modelling studies to assess possible effects of changed dynamic processes have been completed. The results of particle analysis are awaited.

### Key environmental issues

A wide range of issues is being addressed, but detailed assessment on many of these, is

*Schematic diagram showing environmental assessment and management process*



dependent on the level of design achieved at each stage of the Design, Build and Operate (DBO) procurement process. These issues include:

Noise and vibration

Air quality, carbon emissions, dust arisings

Effects on marine and terrestrial ecology

Effects on biodiversity

Land take and land use

Landscape and visual impact

Effects on residential, commercial, industrial, agricultural and other land uses

Disruption to users of roads, footpaths and amenity areas

Effects on surface water environment

Effects on heritage features

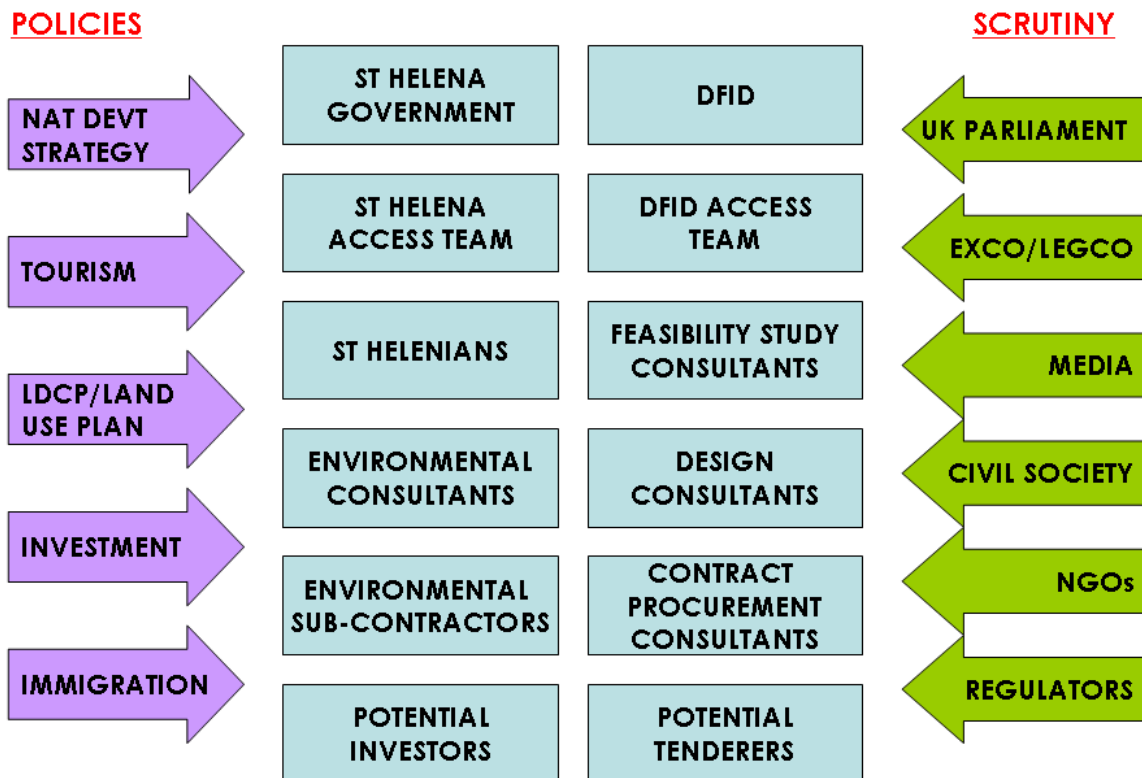
Waste management

Opportunities/benefits

### EIA process

Because there are few local standards for environmental impact assessment (EIA), the consultants have been tasked with applying international good practice in a proportionate manner and adapted to the circumstances of St Helena. The process will be generally consistent with the requirements of St Helena's Land Development Control Plan (LDCP) which requires environmental statements and social impact





assessments to be submitted with applications for development permission for any major scheme.

The project is required to meet the highest possible standards of environmental assessment and management. It has been agreed with the environmental consultants that the outputs of the EIA to be submitted in support of the Application for Development Permission should be defensible in terms of the normal expectations of the planning process in the UK.

The outputs will be:

- Environmental assessment reports
- Environmental Management Plan
- Public Consultation and Disclosure Plan
- Additional specialist studies and mitigation proposals
- Local skills transfer
- Compliance monitoring during construction

However, EIA is a process, not a single output. The environmental assessment process has to run alongside the DBO contract process (see diagram on previous page). The red arrow is where we are now.

The EIA is taking place:

- in the midst of a wide range of actors (see diagram above)
- against new policies being developed by SHG to meet the new challenges; and
- quite properly, under scrutiny, both internally in St Helena and externally.

We are fortunate to be able to call on the expertise of a wide range of specialists, both on St Helena and elsewhere. We are fortunate also to have been able to develop constructive dialogues even with those external specialists and commentators who – in the interests of biodiversity conservation – might prefer an airport not to be built, but who

recognise that the social and economic future of the island's people is dependent on taking this major step now.



Rupert's Bay: existing infrastructure



*Left:  
View from Prosperous Bay Plain  
down to Prosperous Bay*



*Right:  
View south across  
Dry Gut towards  
Great Stone Top*

## **Key biodiversity and environmental issues**

### **Sensitive Features at Rupert's Bay and the Wharf Area**

#### **Commercial Properties:**

- Fish processing – includes landing stage, two processing plants all of which are essential to the island's economy
- Bulk fuel farm
- Warehousing

#### **Coastal and Marine:**

- Sensitive marine and coastal habitats and wildlife
- Coastal scenery

#### **Rupert's Beach:**

- Important beach and amenity area to remain open

#### **Heritage interest:**

- Fortification wall, Rupert's Lines
- Boer prisoner of war desalination plant, including chimney
- Banks Valley Battery

### **Sensitive features at Deadwood Plain and Longwood**

#### **Residential areas and community facilities:**

- housing on route of haul/access road
- schools, amenity areas (Millennium Forest)
- meteorological station, landfill waste site

#### **Footpaths and Roads:**

- existing roads, paths to landmarks

#### **Agriculture:**

- arable and pastoral farming crossed by haul/access road

#### **Heritage Interest:**

- Longwood House & conservation area, Boer POW camp

#### **Key Wirebird Habitat**

(NB Since this presentation was made (October 2006), the project has been re-tendered against reference designs prepared by SHG/DFID's consultants, into which the environmental consultants have had significant input. Under the revised timetable, it is expected that a contract will be let in 2008.)



*Enhanced satellite image of Longwood and Deadwood Plain*

# Terrestrial biodiversity conservation in Mauritius and Rodrigues: the upscaling and mainstreaming challenge

John Mauremootoo, CAB International, formerly Mauritius Wildlife Foundation

Mauremootoo, J. 2007. Terrestrial biodiversity conservation in Mauritius and Rodrigues: the upscaling and mainstreaming challenge. pp 178-191 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)



The terrestrial biodiversity of the Mascarene Islands (Mauritius, Rodrigues and La Réunion) exhibits high levels of endemism typical of tropical islands of their age and isolation. Introduced species have been and continue to be the main cause of extinctions in the Mascarenes since their colonization by man from the late sixteenth century. Mauritius and Rodrigues are the two major islands that make up the Republic of Mauritius. While both islands have had many documented extinctions since colonization, they can also boast of many conservation success stories in which species have been brought back from the brink of extinction by a combination of single species and habitat management. The primary focus of habitat management to date has been the intensive control of introduced species in small areas selected for their biodiversity importance. While the management of biodiversity in these areas has been successful, in most cases native biodiversity in surrounding habitats is continuing to decline due to the impact of introduced invasive species. Having saved many species from the brink of extinction, today's challenge is to increase the scale of ecosystem restoration efforts in order to make these gains sustainable. Ecosystem restoration in Mauritius and Rodrigues is a costly undertaking. In order to increase the scale of restoration efforts it will be necessary to attract increased funding. It is unlikely that finance on the scale needed can be found from traditional conservation funding sources alone. Mainstreaming conservation - the integration of conservation into priority national objectives - is a possible way of sourcing the necessary funds. Several mainstreaming possibilities for Mauritius and Rodrigues are examined and their pros and cons are summarised. Possibilities include the restoration of native forests for watershed management, the promotion of native forests as a tourist resource, and the use of forest restoration as a social welfare activity.

**Dr J.R. Mauremootoo**, Senior Scientist – Invasive Species, CABI Africa Regional Centre, P O B 633 - 00621, Nairobi, Kenya. [j.mauremootoo@cabi.org](mailto:j.mauremootoo@cabi.org)

## 1. Introduction

The Republic of Mauritius comprises the two major islands Mauritius (1865 km<sup>2</sup>) and Rodrigues (109 km<sup>2</sup>) and their 67 associated islets (49 islets inside and outside the lagoon around Mauritius and 18 all inside the lagoon of Rodrigues), as well as several other small Indian Ocean islands. Mauritius lies about 900 km east of Madagascar and Rodrigues a further ca. 600 km east of Mauritius. The Mascarene archipelago (Fig. 1.a) includes Mauritius and Rodrigues, together with La Réunion (politically a Département Outre Mer of France).

Concerted conservation efforts began in Mauritius about 25 years ago with intensive species recovery

programmes for several bird species that were on the brink of extinction. These efforts have since expanded into further species recovery programmes for endangered vertebrates and plants, and intensive ecosystem restoration programmes of mainland and islet sites of key biodiversity importance. The methods and impressive achievements of these programmes are summarised in this paper. The next challenge for Mauritius is to scale up ecosystem conservation efforts while consolidating the gains made to date. The main areas that need to be developed in order to scale up restoration efforts centre on the management of invasive alien species and in particular invasive weeds. Possible ways in which this can be achieved and potential mechanisms for financing these programmes are outlined in this paper.



## Western Indian Ocean



Figure 1.a. Mauritius and Rodrigues in the Indian Ocean

### 1.1 A Globally Significant Biodiversity

The Mascarenes stand alongside the Galapagos, New Zealand and Hawaii as archipelagos, which, by virtue of their situation, age and isolation have become homes for a fascinating flora and fauna

**Table 1: The level of endemism of selected elements of the Mauritian native biota (figures include species known or thought to be extinct)**

	Flowering plants	Birds	Reptiles
Total native taxa	685	28	19
Strict endemics	311 (45%)	15 (54%)	17 (89%)
Mascarene endemics	459 (67%)	19 (68%)	17 (89%)

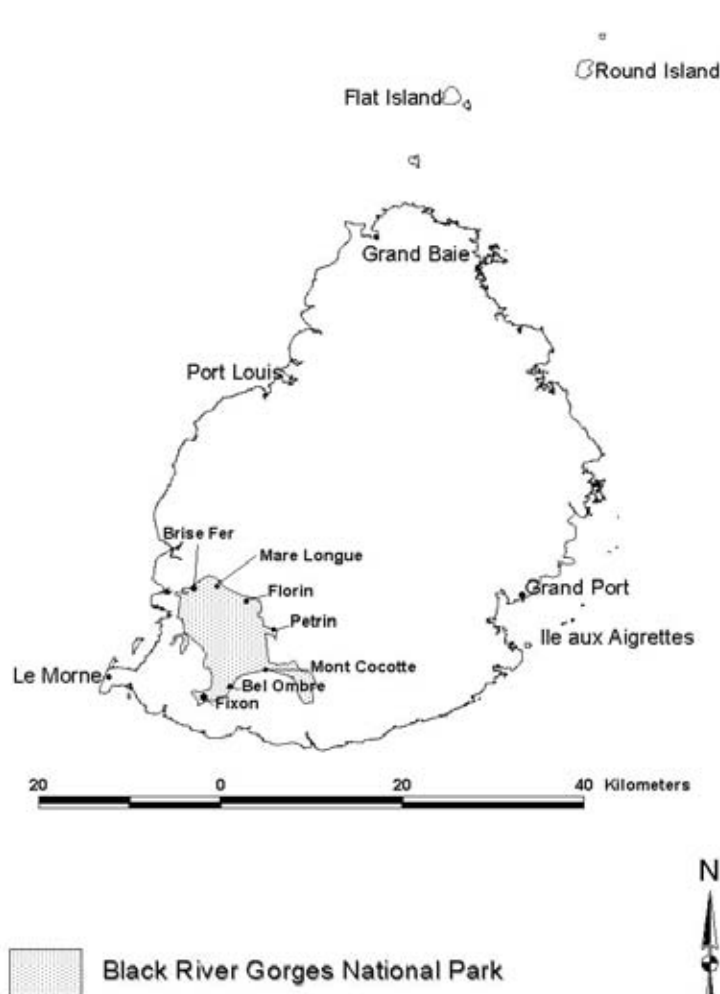


Figure 1.b. Mauritius - Sites of major biodiversity importance referred to in the text.

is degrading at a rapid rate. Of its remaining 11 remaining species of land bird 9 are endangered and 105 species of flowering plant in Mauritius are considered to be Critically Endangered (sensu IUCN, 1998). In Rodrigues the losses are even greater. No contiguous areas of native forest are left, only 3 species of the 17 original vertebrate species remain, and 35 of the remaining 37 endemic plant species are endangered.

These dramatic statistics are a consequence of a range of anthropogenic factors, which have acted on the islands since their colonisation just 400 years ago. This section details those processes and impacts.

### 1.2.1 Habitat Destruction

Habitat destruction, chiefly for agriculture and settlement has been very rapid on both Mauritius and Rodrigues. Agriculture is very intensive with 45% of Mauritian land under cultivation, and

with many unique species. This high degree of endemism can be illustrated using the example of Mauritius (Table 1).

The high level of endemism and species diversity per unit area has resulted in the islands being identified as a Centre of Plant Diversity (CPD Site 102) by the IUCN (Strahm, 1994) and the inclusion of the Mascarenes in the Madagascar and Indian Ocean islands biodiversity hotspot (Myers et al. 2000).

## 1.2 Extinctions and Rarity caused by Habitat Destruction, Direct Exploitation and Alien Species Invasion

Mauritius only has about 2% of native forest remaining and even this

Figure 1.c. Rodrigues - Sites of major biodiversity importance referred to in the text.



the island including the major watersheds (Gade 1985). Reafforestation of watersheds has been implemented in Rodrigues over the past 30 years using alien forestry plantation species, many of which are invasive or water-demanding species.

On Mauritius, the remaining native forests are highly fragmented. The majority of remnant patches are situated in the uplands of the south-west of the island, in the 6,574 ha. Black River Gorges National Park. Smaller remnants of high biodiversity importance are found in the southeast and the northern mountain ranges. In addition, there are a few other forest patches which are important for particular rare plants and animals; only a few of these areas are in managed nature reserves. All of the non-managed areas of native forest on Mauritius are invaded to some extent by alien invasive woody weeds.

The situation is even more extreme on Rodrigues, where there is no surviving contiguous native forest canopy at all. Patches of endangered plant species are scattered across the island. The Mourouk Valley has the largest concentration of native plant vegetation and diversity. Grande Montagne nature reserve contains a number of specimens of key Critically Endangered plant species. Anse Quitor nature reserve contains a range of lowland Critically Endangered plant species not represented in Mourouk or Grande Montagne. Although they contain some of the 'best' remaining native vegetation of Rodrigues, all three areas are dominated by alien invasive woody weeds.

A significant amount of native biodiversity still remains on the small islets off Mauritius and Rodrigues. By virtue of lack of settlement, and in many cases relatively limited introductions of invasive alien species, these areas have been spared some of the worst destruction that has affected equivalent areas on the mainland. Round Island, a 169 ha islet about 20 km from the northern coast of Mauritius contains at least four (possibly five) species of reptile found nowhere else on earth. These species were spared extinction because rats have never colonised the island (Bullock 1986). Round Island also contains the last remnants of the palm-rich forest that once clothed much of northern Mauritius. Ile aux Aigrettes, a 26ha islet less than one kilometre from the southwest coast of Mauritius, contains the best remaining remnant of coastal ebony forest that used to surround much of the main island. Like the mainland forest remnants,

all of the non-managed offshore islets are highly invaded by alien invasive weeds. Round Island is the only islet that has escaped invasion by woody weed species.

### **1.2.2 Direct Exploitation**

Direct exploitation of certain species has pushed them towards extinction. Mauritius was originally settled for its hardwood timber, which was highly prized. Many of the species that were exploited are now extremely rare. All of the Mauritian palm species were probably exploited for their edible hearts and all are now threatened (Maunder et al. 2002). The five endemic species of Mascarene giant tortoises (two species each on Mauritius and Rodrigues and one species on La Réunion) are all now extinct having been massively exploited for their highly palatable meat (Cheke 1987). Direct exploitation of most species has now largely ceased although certain plant species are still being taken from the wild in large quantities for medicinal purposes, notably in Rodrigues, and endemic reptiles have been illegally caught for the international pet trade.

### **1.2.3 Invasive Alien Species**

At least 21 introduced species of mammal, reptile and mollusc are naturalised in Mauritius, with assumed detrimental effects on native flora, while 18 plant species have been identified as particularly aggressive invaders in Mauritius (Strahm 1999). Animals such as Javan deer *Cervus timorensis*, introduced to Mauritius in 1639, browse native seedlings and spread alien seed. Feral pigs *Sus scrofa*, introduced in 1606, disturb the soil and spread alien seed. Egg predation by pigs was also probably partly responsible for the extinction of several endemic species that nested on the ground, notably the dodo *Raphus cucullatus* and two species of giant tortoise *Cylindropsis inepta* and *Cylindropsis triserrata*. Feral pigs also probably adversely affect ground-dwelling invertebrates. Javanese macaques *Macaca fascicularis*, introduced at the turn of the seventeenth century, damage native fruits before maturation and predate on eggs and chicks of native birds. Rats *Rattus rattus* and *Rattus norvegicus*, possibly introduced prior to first settlement, predate on eggs and chicks of native birds (Safford & Jones 1998). Both rat species also predate on invertebrates and are notable seed predators (Cuddihy and Stone 1990).

As highlighted in section 1.2.1, all of the vegetation zones of Mauritius and Rodrigues, apart from those areas that are undergoing restoration,



are highly invaded by alien invasive weeds. The dominance of invasive weeds is rapidly increasing in all areas that are not managed. This degradation is caused by a diverse suite of alien weed species. Their impacts can be illustrated by the examples of Chinese guava *Psidium cattleianum* and privet *Ligustrum robustum*, two of the dominant invasive plant species in the upland forests. *Psidium* first noted as being present in Mauritius in 1763 (Rouillard and Guého 2000), is spread by native and exotic birds as well as by invasive mammals such as wild pigs and macaques (Strahm 1999). *Ligustrum*, first cultivated in plantations in 1902 (Rouillard and Guého 2000), is spread by native and alien bird species. Both Chinese guava and privet are capable of establishing under deep shade and have relatively rapid growth rates, high fruit establishment and long fruiting seasons (Smith 1985 and Lavergne et al. 1999). All non-managed areas of native upland forest on Mauritius are highly invaded by Chinese guava and privet. A recent quantitative survey of ten 50 x 20 m plots of native Mauritian upland forest, first surveyed 60 years before, has shown that only 29% of native trees and shrubs remained after the 60 year period (Motala 1999). These losses included many large mature trees. This is clear evidence that the upland native forest is very rapidly being strangled by the alien weed invasion.

## 2. Terrestrial Conservation methods and achievements in Mauritius & Rodrigues

The wide range of activities that make up the conservation programme in Mauritius and Rodrigues can be divided into distinct categories:

- Species recovery programmes
- Weeded and fenced conservation management areas
- Active restoration of degraded areas by weeding and planting
- Islet restoration

This section reviews the methods used in each category of action in the Mauritian context, and the resulting conservation achievements to date.

### 2.1 Species Recovery Programmes

In recent years Mauritius has had the dubious distinction of being home to the world's most endangered raptor, pigeon and parrot; the Mauritius kestrel *Falco punctatus*, down to a single known pair in 1973, the pink pigeon *Columba mayeri*, down to 10 known birds in the wild in 1990, and

the echo parakeet *Psittacula eques echo*, down to 12 known birds in the wild in 1986. Concerted conservation work in Mauritius began with the species recovery programme for the Mauritius kestrel in the early 1970s (Jones and Hartley 1995) along with preliminary conservation work on the pink pigeon and echo parakeet. Rare plant species recovery work began in the early 1980s.

The rationale behind each species recovery programme is that as much effort as is practically possible must be made to enhance the survival success of each individual of the endangered species in question. There are several reasons behind this.

- These species are very rare so every individual is precious.
- Each individual (at least in the founder population) must have the chance to reproduce to maximise the genetic variability in the recovered populations.
- The chances of emerging from a genetic bottleneck with the maintenance of a high degree of population heterozygosity is maximised if the numbers can be rapidly increased (Frankel and Soule 1981).
- The threats that made the species endangered in the first place are probably still present and therefore any recovery programme is unlikely to succeed if these threats are not managed.

#### 2.1.1 Species recovery management methods

Management techniques used in Mauritius for bird conservation focus on intensive management of wild populations backed up by captive rearing and releases. These techniques include: harvesting wild eggs to encourage extra production in the wild and for captive rearing, fostering of chicks to wild or captive pairs without offspring (or in captivity to related bird species where appropriate), predator control around nests and in feeding areas, provision of artificial nest boxes, supplementary feeding of released birds, and veterinary intervention where necessary. The use of these methods in Mauritian bird species conservation has been documented in detail elsewhere (e.g. Jones and Duffy 1993).

The plant species recovery programmes in Mauritius and Rodrigues include population surveys and intensive efforts to propagate rare plant species from seed or vegetatively. Trials are undertaken in order to optimise growing conditions. Amongst the factors that have been investigated in order to optimise propagation are: media used, seed treatment, pest management in

the nursery, and planting practices. Plants are not necessarily planted in the area of origin of the parent stock, as it may be very difficult to manage the threats to the plant in these locations. Therefore many plants are reintroduced to appropriate locations in managed nature reserves, Conservation Management Areas (Section 2.2.) and intensively managed islets. In recent years there has been an increasing emphasis on after-care of those plants that have been reintroduced.

### **2.1.2 Species recovery achievements**

Intensive management has helped the kestrel to reach a population of over 600 birds at the time of writing; as this is a healthy population size for an island raptor the Mauritius kestrel is now considered to have been saved from extinction (Jones, pers. comm.). The pink pigeon and echo parakeet currently have wild populations of between 350 to 450 and between 150 and 170 birds respectively and are on their way to safety, although both populations still require intensive management. Part of this management has been habitat manipulation such as area-wide predator control. The potential for self-sustaining pink pigeon and echo parakeet populations in the long term is limited by the lack of available habitat (unlike the Mauritius kestrel which has adapted well to secondary forest). Therefore, integration of species recovery with ecosystem restoration programmes will be critical to the long-term success of these species recovery programmes.

The intensification of plant species recovery efforts in Mauritius and Rodrigues in recent years has resulted in the production of large numbers of endangered plants. From 1998-2001 70,000 individuals of 39 species of endangered plants have been propagated on Rodrigues, 17,000 individuals of 21 species of endangered plants on Ile aux Aigrettes. Nearly 9,000 individuals of 48 species of endangered plants have been propagated on the Mauritius mainland over the 10 years to the end of 2000. All of these specimens have been reintroduced into appropriate areas of managed native forest.

## **2.2 Weeded and Fenced ‘Conservation Management Areas’ (CMAs)**

The concept of small managed areas for the protection of endangered forest types and Critically Endangered plant species was spearheaded in the late 1930s by Vaughan and Wiehe. These authors surveyed ten 50 x 20 m plots in the Macabé

forest in the south-western uplands of Mauritius (1941). One of the ten plots was earmarked as an intensive study plot (‘Vaughan’s plot’). The authors recommended that this plot was weeded of all alien species and fenced to keep out introduced deer and pigs. The plot was weeded sporadically from the late 1930s but was not fenced until 1986. In 1986 Strahm and Dulloo resurveyed the woody plants in this plot (Strahm 1994). In spite of the inconsistent management Vaughan’s plot was considerably more diverse in 1986 than an adjacent non-managed plot.

The results of the surveys at Macabé inspired the setting up of a series of weeded and fenced Conservation management Areas (CMAs) in different parts of the upland forest that were representative of the different ecotypes identified by Vaughan and Wiehe in 1937. Overall management of the CMAs in the National Park is by the Mauritian Government’s National Parks & Conservation Service (NPCS) with the Mauritian Wildlife Foundation (MWF) in a consultative capacity. MWF also manages individual projects within the National Parks and the CMAs. The CMAs outside the park are managed by a variety of public and private agencies.

### **2.2.1 CMA restoration and management methods**

In spite of the fact that the CMA sites are chosen for their relatively high proportion of native canopy cover, amongst other criteria, initial weeding is still a labour-intensive task. The first step of initial weeding is to hand-weed all of the relatively easily removed alien seedlings, saplings and herbaceous vegetation. This is followed by the cutting of woody stumps (which are mostly of Chinese guava and privet) with a machete and manually uprooting the stumps with the aid of hand tools. Cut stump treatments using herbicides have been used sporadically in the past but with little consistent documentation of the methods or monitoring of efficacy. A trial of initial weeding using herbicide treatments is currently ongoing (Mauremootoo and Florens unpublished data). Occasionally individuals of some non-native species have been left or allowed to regenerate in areas that are highly degraded. These are then slowly removed as native species establish themselves.

The number of man-hours that it takes to initially manually weed an area varies with biotic factors such as initial forest quality, site substrate and

alien species composition as well as logistical considerations such as remoteness of the site and degree of motivation of the labour team. Time-motion studies have estimated initial weeding to vary from between 315 and 890 man-hours per ha, costing an estimated \$US9,000 per ha on average (all costs, in US dollars are given are at 2001 prices and exchange rates).

The CMAs are fenced using 2 m high chain link fencing of 7.5 mm mesh size, topped with barbed wire to a varying height to keep out passers-by. Posts are 3 m apart and of 11.5 cm thick treated wooden poles. In most instances the base of the fence on the outer side is covered with small rocks to prevent pigs from burrowing into the fenced area. The total fence cost is ca. \$70 per running metre.

Until recently each weeded area has been 'maintenance' weeded four times per year. The annual budget for maintenance weeding of the 38 hectares of weeded CMA under the management of the National Parks and Conservation Service (NPCS) is \$74, 000. Since 1999 the frequency of maintenance weeding has been reduced to three times per year.

Control of predators is carried out in CMAs where intensive management of native birds, in particular pink pigeons and echo parakeets is being undertaken i.e. Brise Fer, Mare Longue and Fixon (Roy 2001). Cats and mongooses have been systematically controlled in these areas since the early 1990's. They are live trapped throughout the year in an intensive grid and along access points. Rats have been controlled sporadically in some CMAs since 1992, mainly using the anti-coagulant Brodifacoum.

### 2.2.2 Conservation Management Area achievements

Currently eight weeded & fenced CMAs, covering an area of ca. 40 ha, have been created in the Black River Gorges National Park. Three plots covering an area of approximately 17 ha are being managed in a similar way outside the park (Table 2).

**Table 2. Fenced and weeded Conservation Management Areas in Mauritius created from 1969-2002**

Name	Size (ha.)	Date first weeded
<b>CMAs in the National Park</b>		
Bellouget	2.5	1994
Brise Fer	24	1986-87
Fixon	4.3	1994
Florin	2.53	1995
Pétrin	6.2	1994
Macabé	0.4	1986
Mare Longue	3.46	1993
Montagne Cocotte	0.338	1987
<b>CMAs outside the National Park</b>		
Mondrain	5	1979
Perrier	1.44	1969

In order to gauge the effectiveness of CMA management several studies have been undertaken to assess the densities of key taxa inside CMAs and in comparable adjacent non-managed areas. These include studies on the following taxa: native tree and shrub saplings (Eydatoulah 1999), native butterflies (Mauremootoo unpublished data), native and non-native land snails (Florens 1996) and native passerines (Hill unpublished data and Ali Boyla 2000). No studies were carried out on the effects of CMA management on pink pigeons and echo parakeets, as any effects would be compounded by the fact that these birds are being released and fed in these areas. However, it has been observed that pigeons increase the use of these sites immediately after initial weeding (Jones, pers. comm.). The effect of CMA management on kestrels has not been assessed because of methodological difficulties.

The results of the above CMA studies can be summarised as follows:

- Consistent weeding and maintenance of fences appears to result in a high level regeneration of native flora. In the Brise Fer 'Old Plot', first weeded and fenced in 1987, a minimum of between 53% and 68% of native tree taxa are regenerating compared with between 32 % and 40 % in an equivalent non-managed area. Differences for numbers of individuals regenerating are even greater with 4.5 times more individuals in managed than in non-managed area. It is likely that the numbers of species regenerating would have been higher if this plot were larger due to species areas effects. However, some species would be unlikely



to regenerate even in a larger plot possibly because of the action of mammals that cannot be excluded by conventional fences.

- The diversity of native seedlings and saplings is relatively low in a more recently managed part of Brise Fer and in the nearby Mare Longue CMA respectively. In the former this may be due to the fact that several deer were fenced into the CMA for over two years. In the latter, rocks were not placed at the foot of the fence, thus allowing pigs to burrow into the plot.
- Native butterflies were on average nineteen times more abundant in the surveyed CMAs than in non-managed areas. Species composition varied between different CMAs in relation to canopy cover, which is well correlated with years since initial weeding.
- The results for native birds were equivocal. It is clear that very degraded forest areas were poor for native birds but one group (the Not Threatened endemic grey white eye *Zosterops borbonica*) was found in higher numbers in non-managed areas with the equivalent native canopy.
- The densities of some native snail groups were lower in the Old Plot than in an equivalent non-managed area. This may be due to the effect of persistent rat poisoning and the change in habitat after initial weeding.

These summaries therefore show that the current CMA methodology can be highly effective if the fencing is maintained to a consistently suitable standard, and if any incursions of deer and pigs are dealt with rapidly. They also show that weeding methods may have to be modified to minimise non-target damage. For example, weeding could be carried out in relatively small patches, in contrast to current practices of weeding contiguous areas systematically. This could provide relatively sessile organisms, potentially negatively impacted by initial weeding, with refugia from which to recolonise weeded areas as native vegetation regenerates. In addition, non-regenerating or negatively impacted species may have to be managed individually. Finally, as rat and monkey predation of eggs, chicks, fruits and seeds are likely to be major limiting factors in the recovery of more sensitive bird and plant species, it may be cost effective to complement or replace current CMAs with areas protected by predator-exclusion fences. Predator-exclusion fences are successfully and increasingly being used in analogous situations in New Zealand and Australia, and a pilot testing of this technology is just about to start in

Mauritius.

## **2.3 Restoration of Extremely Degraded Areas by Intensive Weeding and Planting**

In some cases even intensive weeding and fencing will not be enough to secure the ecosystem restoration goals we have set ourselves. Some of our restoration sites have become so degraded that weeding alone may simply provide the conditions for the huge weed seedbed to germinate and rapidly choke the area with weeds once again. In addition there are likely to be very few native species in the seedbank to compete with the weeds. In these cases we will weed (either partially or completely depending on factors such as slope and shade requirements of the plants we are planting) and plant native pioneer plants in order to colonise the site. At first hearing it seems strange that we would choose a restoration site that is almost completely invaded. The sites are chosen because they contain some very endangered plant and animal species (e.g. Grande Montagne), because they form a part of an otherwise fairly well conserved ecosystem (e.g. the areas of Ile aux Aigrettes close to the ebony forest zone) or because the area is part of a small island which, in the long term may be restored to an almost completely native cover with minimum reinvasion from alien seed sources (e.g. Round Island).

### **2.3.1 Methods used in active restoration of extremely degraded areas**

Initial weeding of extremely degraded areas is very intensive. The following figures from Ile aux Aigrettes are typical of the sites being restored in Mauritius and Rodrigues. Initial weeding (mainly by hand) of degraded areas takes about 1920 man-hours per hectare. This translates into a cost of approximately \$3,000 per hectare. These weeded areas are then planted with nursery-grown native pioneer species. The initial heavy weeding must soon be followed up by intensive light weeding because the sudden increase in light levels in the newly weeded areas results in a rapid germination of the very large weed soil seed bank. Such high intensity maintenance weeding may take another 1920 man-hours per hectare in the first year of management. The effort then diminishes exponentially in subsequent years as the weed soil seedbank is exhausted and planted native species grow, thus decreasing light levels on the ground and increasing competition with regenerating weeds. Once a good canopy is established (within 4-10 years following initial weeding) the area

needs to be weeded only once every five years (ca. 440 man-hours per hectare or 88 hours per ha. per year). This translates into a long-term maintenance cost of ca. \$140 per ha.

### 2.3.2 *Achievements in active restoration of extremely degraded areas*

The focus of active restoration of extremely degraded areas has been in the two original nature reserves of Rodrigues (Grande Montagne and Anse Quitor) and on Ile aux Aigrettes (an offshore islet of Mauritius). Intensive restoration of extremely degraded areas of Round Island has been started very recently (mid 2002).

From 1998 – 2002 around 15 ha of degraded forest has been restored in the two nature reserves on Rodrigues. The plants have grown faster than anticipated with some species capable of putting on over a metre of growth in height in a year. Survivorship levels have also been high with many species showing over 80% survival. The restored upland plot at Grande Montagne is now beginning to attract rare endemic birds which are using the newly planted trees as nest sites.

From 2000 – 2002 around 7 ha of degraded forest has been actively restored on Ile aux Aigrettes. Growth and survival rates of the introduced plants have been similar to those on Grande Montagne. The restored areas are beginning to attract the reintroduced pink pigeon.

## 2.4 Islet Restoration

In theory most of the islets that surround Mauritius and Rodrigues could be restored given the relative ease with which mammals such as rats and cats can be eradicated and reinvasion minimised and our increasing abilities to grow and plant out native plants. However resources are always limited so the management of Mauritian islets has been prioritised based on each islet's intrinsic conservation value, ease of restoration and competing priorities of other sectors. The following categories have been chosen (Bell et al. 1994):

- Strict nature reserves: Islets with high endemism and relatively few invasive species problems e.g. Round Island.
- Open nature reserves: Islets with Conservation



*Plate 1. Restoration of degraded forest in Rodrigues: Photopoints - Grande Montagne Rodrigues*

potential that can be used for controlled tourism. Already with a lot of invasives present e.g. Ile aux Aigrettes.

- Tourism and recreational islets: Those that are highly degraded but have important leisure and tourism value and long term potential for restoration
- Passive reserves: The remaining islands on which any developments must be carefully considered so that their (current and potential) values are maintained.

### 2.4.1 *Islet restoration methods*

Once an island has been chosen for restoration management, the first step has been to legally ensuring there are no inappropriate development projects, next to eradicate introduced vertebrates as far as is possible, and then to manage its vegetation through a mixture of CMA-type management and active restoration (as outlined in section 2.3.1). Once the restoration process is started, the establishment and maintenance of good quarantine controls is essential, and must continue indefinitely. This is necessary to prevent reinvasion of the mammal species that have been eradicated

or never have reached the island and to keep out plant species, many of which would be difficult or practically impossible to eradicate from even the smallest of islands.

#### **2.4.2 Islet restoration Achievements**

Rabbits and goats have been eradicated from Round Island, rats and cats were eradicated from Ile aux Aigrettes, hares have been eradicated from Gunners Coin and mice have been eradicated from Ile aux Cocos (Rodrigues).

Pilot restoration activities on Round Island were carried out periodically from the early 1980s to mid 2002. All major weeding and planting were planned for completion on Ile aux Aigrettes by 2003; major acceleration of the intensive restoration of Round Island vegetation started in mid 2002.

Rats have also been eradicated from other islets of high conservation potential; restoration of these islets will be possible given additional funding, time, enhanced techniques and avoidance of inappropriate development projects.

### **3. The Next Step: The Challenge of Large Scale Restoration?**

After about 25 years of hands-on conservation in Mauritius we can summarise some of our major achievements as follows:

- We have saved many of our most endangered species from the brink of extinction
- We can probably save most of our remaining endangered species from the brink of extinction, given sufficient resources
- We can restore Mauritian forest ecosystems to something approaching their former state in a relatively short period of time through intensive restoration programmes
- We can propagate most of the endangered plant species of Mauritius and Rodrigues
- Conservation capacity in Mauritius has increased hugely in recent years
- Mauritius has provided examples of successful conservation efforts which have inspired others in similar 'desperate' circumstances to believe that success is possible.

These conservation achievements are already very impressive, however we are still only working to conserve a very small proportion of the areas that have restoration potential. Currently we are actively restoring only 18% of the area of islets

that have high restoration potential, and only 2% of mainland areas that have high restoration potential. In the meantime, 'good quality' native forest that is not being managed is very rapidly degrading (Motala 1999).

It could be argued that the Mauritian conservation effort should stick with the tried and tested techniques, continuing to intensively manage individual species and small areas, and not try to over-stretch itself by scaling up the effort. We agree that we must consolidate our gains. However, it is clear, from the combined evidence of the limitations of our current achievements, that we can only create truly viable populations of our endangered plant and animal species if we scale up our existing efforts. There are several reasons why this is imperative:

Lack of habitat for many endangered species: Taking the example of the Critically Endangered echo parakeet population, this species is already apparently food limited and its numbers are a long way below its minimum viable population. The echo parakeet is also limited in terms of nesting sites, because it nests in cavities in large native emergent trees which are dying rapidly due to unmanaged weed competition (although this might possibly be rectified by the provision of artificial nest boxes). Pink pigeons, known to favour native foliage, flowers and fruit are also probably food limited and are currently dependent on supplementary feeding. Good regeneration levels for many native tree species are occurring in the best managed CMAs but most species are only regenerating in very low numbers because of an absolute lack of suitable areas. Without very significant expansion of the area of managed upland forest, it is likely that much diversity and many species will be lost in the long-term through processes such as genetic drift and stochastic factors (notably cyclone impacts).

Likelihood of extinction of the many species for which individual species recovery programmes are not practical: We are well aware that the situation is critical for our endangered birds and for many of our endangered plant species. It is also extremely likely that the loss of habitats for these species is resulting in an unseen but equally dramatic loss in the diversity of less charismatic biota such as native invertebrates, lower plants and fungi.

Viability of managed areas is likely to be positively related to fragment size: The smaller CMAs such



as Macabé are proving very difficult to maintain, as the weed reinvasion rates are so rapid. Cyclone impacts are also increasing because the forests surrounding CMAs are degrading to a low stature Chinese guava dominated thicket, with the result that the taller vegetation within CMAs is decreasingly buffered against cyclones. In addition such plots provide limited parent material, a problem exacerbated by the degradation of the surrounding non-managed area.

Even if it is agreed that the scaling up of forest restoration is a desirable goal, it could be argued that this aim is unrealistic given the fact that current approaches to restoration are so labour intensive. The tacit assumption behind advocating an increasing in the scale of restoration operations must therefore be that we can either reduce costs or raise additional financing. This could be achieved through: (1) Reducing the unit cost of restoration activities; primarily through minimising the cost of weed management. (2) Additional government investment in conservation. (3) Development of alternative financing mechanisms for some components of restoration. Several approaches to this problem, all of which need urgent investigation, are outlined below.

### **3.1.1 Fine tuning existing techniques**

It is clear that we can improve current practices. Initial weeding costs, for example, can be halved by replacing labour intensive uprooting with paintbrush herbicide application to cut stumps. Observations indicate that it is not necessary to weed CMAs nearly so frequently as is currently the case following the initial need to reduce the high residual levels of alien weed seed in the soil seed bank. Maintenance weeding can also be rationalised by concentrating on removal of species that represent a threat to native species regeneration, rather than removing every non-native plant to produce a 'clean' plot. It may also be possible to save on fencing costs in the upland forests by conducting park-wide deer and pig control, probably at zero cost (e.g. by granting concessions for responsible hunting). By integrating these measures it would be possible to considerably increase the area of managed CMAs within the current budget. However, even if this fine-tuning resulted in a five-fold increase in the managed area, the total area of conserved forest would still be relatively small.

### **3.1.2 The use of fire**

Fire has been widely used as a weed management

tool around the world (Hardy and Arno 1996). In some ecosystems burning is a way of stimulating the regeneration of native species. This is not the case for Mauritian ecosystems, which show no signs of being adapted to fire. Therefore it is not feasible to use fire in areas that already have a good cover of native vegetation. However, in areas that are almost completely covered with alien weeds a controlled burn may be the most efficient way of initially reducing this weed infestation. The use of fire could therefore significantly reduce the costs of active restoration of extremely degraded areas.

### **3.1.3 The use of grazers**

The Mauritian ecosystem has lost many of its key components in the 400 years since man's colonisation (Cheke 1987). This includes the giant tortoises that once roamed the Mauritian landscape in enormous herds. These animals must have had a huge influence on the ecology of pristine Mauritius and may have been keystone grazers and seed dispersers. Because the tortoise densities were so large, plants would have been under strong selection pressure to defend themselves against tortoise herbivory. It has been proposed that heteroblasty (markedly different leaf forms of the foliage on the same individual plant depending on the height of the foliage from the ground), which is very pronounced in many Mauritian and Rodriguan plants, is an evolutionary response to tortoise herbivory (Eskildsen 2000). Furthermore, anecdotal evidence suggests that Mauritian native plants species are very tolerant of trampling.

Unfortunately the two Mauritian species of giant tortoise are now extinct. However there is a possibility of using an alien but closely related extant species, the Aldabran giant tortoise *Geochelone gigantea*, as a functional analogue for the extinct Mauritian giant tortoise species.

Aldabran giant tortoises were introduced to Ile aux Aigrettes in late 2000 to experimentally investigate their role in vegetation management and in seed dispersal. It is still too early to make definitive conclusions, but preliminary findings are as follows. Tortoises do seem to have the potential to maintain weed populations at low levels but they cannot suppress large existing tall woody weed populations in the short term. Tortoises are also effective seed dispersers of both native and alien species. Therefore, it appears that tortoises might be very effective restoration tools once weed levels are initially suppressed. Nevertheless, potential

negative impacts on native species, and rarer species in particular have not yet been ruled out, so final conclusions on suitability of this method cannot yet be made.

Even if grazing by giant tortoises does prove to be a safe and effective conservation management tool, in practical terms it would be several decades before tortoises would be available in the quantities required to play a significant role. They may also be relatively less effective in the cooler and wetter uplands than in lowland areas such as Ile aux Aigrettes. Nevertheless they may be critical weapons in our restoration arsenal in the long term. They could be used seasonally in upland areas simulating a possible annual movement that may have occurred in pristine Mauritius (V. Florens, pers. comm.). In the meantime an alternative possibility is to use mammalian exotic grazers (e.g. sheep) as part of a managed programme to scale up ecosystem restoration to larger areas.

#### **3.1.4 Integration of cost-reducing restoration methods**

The most likely design for large-scale ecosystem restoration programmes for Mauritius and Rodrigues would be an integration of cost-reducing tools with current methods. Below we give a hypothetical generic scheme for an integrated large-scale restoration approach in the Mauritian context:

- 1) Initial weeding of a degraded area using an integrated approach (area-specific combinations of manual and mechanical weeding, use of herbicides, use of fire and use of grazers and browsers).
- 2) Regular monitoring of the level of weed species in the soil seed bank from the completion of the initial weeding.
- 3) Sowing of non-invasive pasture grasses into weeded area to suppress weed resurgence.
- 4) Stock fencing of managed area to prevent access of domestic stock to zones under long-term conservation management or to degraded zones not yet under a management programme.
- 5) Release of pre-determined densities of domestic stock into the managed area to control the level of weed resurgence from the soil seed bank.
- 6) Removal of domestic stock when the weed seed bank has reached very low levels.
- 7) Managed area left to regenerate from native parent trees in the vicinity or planted with native 'framework' species depending on the prevailing densities of parent plants in the area.
- 8) Selective low frequency manual weed control

continued as necessary.

- 9) Option to periodically introduce livestock into the area if they prove to be relatively selective to the benefit of native species.
- 10) Long-term option of introducing tortoises as a permanent or seasonal feature of the area to aid in weed management and native seed dispersal.

#### **3.1.5 Mainstreaming our restoration activities**

Even if all of our restoration activities are operating at their optimum efficiency they are likely to cost more than they do at the moment if operations are scaled up. The ultimate key to raising the sums of money needed to undertake these efforts will be to incorporate biodiversity conservation into mainstream concerns. The benefits of this would be both in terms of cost recovery and in making conservation activities more central to peoples' lives. Below we give a range of financing ideas, including some currently adopted initiatives:

*Exploitation of woody material produced following initial weeding:* Initial weeding usually results in the production of a large quantity of organic material, which is either left to rot or is burned. In both cases a potential resource is not being exploited. The wood could be chipped and used as mulch, which will aid native saplings (either planted or naturally regenerating) and help to suppress weeds. Waste wood may also be a potential feedstock for biomass fuel production. A limitation of these approaches is the need to get a chipper close to the weeded area. A trailer version can be used for many areas of the forest but not those that are too far away from good quality tracks.

*Taxation on forest products:* This is currently being undertaken for one form of forest exploitation, the export of introduced monkeys from Mauritius for biomedical research. Currently about 8,000 wild caught and captive-bred monkeys are exported each year from Mauritius. A levy of \$50 per monkey is paid into the (National Parks and) Conservation Fund. This fund is used to pay for activities relating to the conservation of Mauritian and Rodriguan native biodiversity.

*Leasing of grazing rights in restoration areas:* We have already mentioned grazing as a means to extensify restoration. Leasing of grazing rights could also provide income to partly cover costs. This approach is becoming more and more widespread in restoration schemes throughout the

world.

*Leasing of hunting rights for park-wide predator control:* Many of the mammal species that if unregulated have the potential to damage our native wildlife, are valued game species. Regular culls may be self-financing to some extent if the hunting rights are leased out. Mauritius has a strong hunting constituency, which would probably be very supportive of such initiatives

*Ecotourism:* Mauritius receives about 600,000 (mostly affluent) tourists every year many of whom would be interested in contributing to the protection of the country's natural heritage, if this concept was marketed in the right way. For perfectly valid reasons most visitors do not know of our greatest terrestrial biodiversity treasures. Round Island is rightly kept as a restricted access nature reserve because of the treacherousness and fragility of its terrain and the vulnerability of its biota to invasive alien species. Many of the best areas for seeing our endemic birds are also restricted access because of our intensive management activities. Only the island nature reserve of Ile aux Aigrettes is geared up for conservation and ecotourism. Well designed attractions on the mainland for example conservation management areas specifically for ecotourism with features such as clear interpretation, canopy walks and animal viewing hides could not only provide sustainable income for conservation but also serve as a powerful awareness-raising tool.

*'Environmental' taxes on tourism:* This approach has been pioneered by Ecuador as one means of financing the conservation of the Galapagos Islands. The Government of Mauritius has implemented such an approach to raise funds for environmental protection in general by establishing an Environmental Protection Fee within the tourism industry (a 0.75% levy on all hotel turnover). These funds are invested in a Government trust fund, the National Environment Fund, which is managed by the Ministry of Environment. It is possible that some of these funds could be made available for large-scale restoration in future.

*Ecosystem services:* It seems very likely that native forest can provide important ecosystem services such as watershed protection. To some extent this function appears to be adequately provided by secondary forest in Mauritius.

However, this does not seem to be the case in Rodrigues, which is relatively dry compared to Mauritius and where much of the exotic forest that clothes the watersheds is of water-greedy trees such as *Eucalyptus*. As it is almost universally acknowledged that chronic water shortages are Rodrigues' number one problem a great opportunity exists to implement a watershed rehabilitation scheme of the type pioneered by the 'Working for Water' (WfW) programme in South Africa in Rodrigues. By focusing a scheme for the removal of alien plants on the provision of water, the South African scheme has managed to tap into funding sources that would not be available for biodiversity conservation alone.

*Employment generation:* Even at their optimum efficiency ecosystem restoration activities will remain labour-intensive. WfW heavily emphasises its socio-economic value as a generator of meaningful employment. Again in Rodrigues, there is a great opportunity to provide employment in an area where there is widespread un-employment and under-employment. An opportunity for linking forest conservation and meaningful employment to prevention of another conservation threat is the system of bad weather payments in Rodrigues. This is a government-funded stipend paid to all registered fisher people each day that fishing is not possible due to bad weather. The result is that the Rodrigues lagoon is severely over-fished and damaged, notably by 'piqueuses d'ourite' fisher women who walk out to and onto the reef to spear octopus. Many of these women admit that they make negligible income from the fish that they catch, and that they register as fisher people in order to get the bad weather payments. The government could thus help solve two biodiversity conservation problems by rechanneling the funds for bad-weather payments into paying these effectively unemployed people to provide labour for forest restoration.

*The use of volunteers:* Current conservation projects in Mauritius would not be as successful as they have been if it were not for the input of volunteers, some of whom possess a high level of skill. MWF uses volunteers to some extent in most of its projects. A great deal of the labour used in the field in the pink pigeon species recovery project is provided by (mainly expatriate) volunteers. Volunteers have undertaken a little over half of the work undertaken for the restoration of Grande Montagne Rodrigues. In this case the volunteers are mostly Rodriguan, a



phenomenon that owes much to the Rodriguan management of the project on the ground and the existence of an active community education project that brings the conservation message to all Rodriguans. With increasing local management of projects and community outreach projects such as that pioneered in Rodrigues becoming adopted in Mauritius, it is likely that the contribution of volunteers to restoration efforts will increase.

Even if the above list is far from exhaustive, it does indicate that an integrated approach to the financing of restoration activities coupled to a similar approach on the technical side gives us the chance to be part of a very exciting future in ecosystem restoration in Mauritius and Rodrigues. We are convinced that the conservation community in Mauritius and Rodrigues can restore large areas of indigenous forest sustainably by harnessing the same creativity and energy that have been responsible for the conservation and economic-development successes in our country to date.

#### 4. Acknowledgements

Major supporters include:

Durrell Wildlife Conservation Trust  
Chester Zoo  
UNDP/Global Environment Facility  
World Bank/Global Environment Facility  
Royal Botanic Gardens Kew  
World Parrot Trust  
Deutsche Bank  
Whitley-Laing Foundation

#### 5. References

- Ali Boyla, K. A. 2000. The impact of habitat management on native and exotic birds in a native forest remnant on Mauritius. MSc. Thesis, University of East Anglia, Norwich.
- Bell, B. D., Dulloo, M. E. and Bell, M. 1994. Mauritius offshore island survey report and management plan. Prepared for the Government of Mauritius on behalf of the Jersey Wildlife Preservation Trust, New Zealand.
- Bullock, D. J. 1986. The ecology and conservation of reptiles on Round Island and Gunner's Quoin, Mauritius. *Biological Conservation* 37:135-136.
- Cheke, A. S. 1987. An ecological history of the Mascarene Islands, with particular reference to extinctions and introductions of land vertebrates. pp. 5-89. In: A. W. Diamond (eds). *Studies of Mascarene Island Birds*. Cambridge University Press, London.
- Cuddihy, L. W. and Stone, C. P. 1990. Alteration of Native Hawaiian Vegetation: Effects of Humans, Their Activities and Introductions. University of Hawaii, Department of Botany, Cooperative National Park Resources Studies Unit, Honolulu, Hawaii.
- Eskildsen, L. I. 2000. Plant-Animal interactions on tropical Islands and rain forests (Mauritius and the Ecuadorian Amazon). University of Aarhus, Denmark.
- Eydatoulah, N. B. 1999. A preliminary survey on the effects of management on the regeneration of native saplings in a Mauritian upland forest. University of Mauritius, Reduit, Mauritius.
- Gade, D. W. 1985. Man and Nature on Rodrigues: tragedy of an island common. *Environmental Conservation* 12:207-216.
- Jones, C. G. and Duffy, K. 1993. Conservation management of the echo parakeet *Psittacula eques echo*. *Dodo, Journal of Jersey Wildlife Preservation Trust* 29:126-148.
- Jones, C. G. and Hartley, J. 1995. A conservation project on Mauritius and Rodrigues: an overview and bibliography. *Dodo, Journal of Jersey Wildlife Preservation Trust* 31:40-65.
- Lavergne, C., Rameau, J. and Figier, J. 1999. The invasive woody weed *Ligustrum robustum* subsp. *walkerii* threatens native forest on La Réunion. *Biological invasions* 00:1-15.
- Maunder, M., Page, W., Mauremootoo, J. R., Payendee, J. R., Mungroo, Y., Maljovic, A., Vericel, C. and Lyte, B. 2002. The decline and conservation management of the threatened endemic palms of the Mascarene islands. *Oryx* 36 (1):56-65.
- Motala, M.S. 2000. A preliminary survey of the decline in upland native forest in Mauritius over a sixty year period. University of Mauritius, Reduit, Mauritius.
- Rouillard, G. and Guého, J. 1999. Les Plantes et Leur Histoire à L'Ile Maurice. MSM Limited, Mauritius.
- Safford, R. J. and Jones, C. G. 1998. Strategies for land-bird conservation on Mauritius. *Conservation Biology* 12(1):169-176.
- Smith, C. W. 1985. Impact of alien plants on Hawaii's native biota. pp. 180-250. In: C. P. Stone and J.M. Scott (eds). *Hawaii's Terrestrial Ecosystems: Preservation and Management*. Univ. Hawaii Coop. Natl. Park Resour. Stud. Unit. Univ. Hawaii Pr., Honolulu, Hawaii.
- Strahm, W. 1999. Invasive species in Mauritius: examining the past and charting the future. In: O. T. Sandlund, P. J. Schei and A. Viken (eds). *Invasive species and biodiversity management*. Kluwer Academic publisher, Dordrecht.
- Vaughan, R. E. and Wiehe, P. O. 1937. Studies on the vegetation of Mauritius I. A preliminary survey of the plant communities. *Journal of Ecology* 25:289-343.



## Topic 6: Dealing with alien invasive species

**Session Organisers: Dr Colin Clubbe (Royal Botanic Gardens Kew & Vice-Chairman UKOTCF) and Dr Oliver Cheesman (UKOTCF Council)**

### Dealing with Alien Invasive Species – Introduction, Overview and Conclusions

**Oliver Cheesman, UKOTCF Council, and Colin Clubbe, Royal Botanic Gardens Kew & Vice-Chairman UKOTCF**

Cheesman, O.D. & Clubbe, C. 2007. Dealing with Alien Invasive Species – Introduction, Overview and Conclusions. pp 193-200 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

**Dr Oliver Cheesman**, 108 Cholmeley Road, Reading, Berkshire RG1 3LY, UK. [oliver@dipsacus.org](mailto:oliver@dipsacus.org); **Dr Colin Clubbe**, Royal Botanic Gardens, Kew Herbarium, Richmond TW9 3AB, UK. [c.clubbe@kew.org](mailto:c.clubbe@kew.org)

#### Introduction

Since the invasive species session at the Bermuda conference (Cheesman *et al.*, 2003), a number of important developments have occurred in relation to invasive species in the UKOTs and more widely. Of particular note, a review and database now exist which summarise baseline information on non-native species in the UKOTs (Varnham, 2006; see Varnham & Fleming, this volume). In addition, the UK Government has published a review of policy on non-native species (Defra, 2003). Although this review confines its attention to Great Britain, its recommendations are more widely applicable. The key recommendations of the review were that the UK Government should:

1. Designate or create a single lead organisation to co-ordinate and ensure consistency of application of non-native species policies across

Government;

2. Develop comprehensive, accepted risk-assessment procedures to assess the risks posed by non-native species, and identify and prioritise prevention actions;
3. Develop (with the participation of stakeholders in all relevant sectors) codes of conduct to help prevent introductions;
4. Develop a targeted education and awareness strategy involving all relevant sectors;
5. Revise and update existing legislation to improve handling of invasive non-native species issues;
6. Establish adequate monitoring and surveillance arrangements for non-native species;
7. Establish policies and capacity to manage and control invasive non-native species currently present or newly arrived in the wild
8. In developing policies and actions, engage with stakeholders through a mechanism such as a consultative forum.

Moore (this volume) summarises steps towards implementation of the first of these key recommendations.

Relevant regional projects are also underway, either focused specifically on UKOTs (the *Increasing regional capacity to reduce the impacts of invasive species on the South Atlantic UKOTs* project – see Box 1) or more broadly (CAB International's *Mitigating the threats of invasive alien species in the insular Caribbean* project – see Box 2), although the extent to which UKOTs will be able





### **Box 1. Increasing regional capacity to reduce the impacts of invasive species on the South Atlantic UKOTs**

Alien species can now be regarded as the greatest threat to biodiversity in the South Atlantic UKOTs. Non-native rodents, invasive plants and feral cats are amongst the key challenges. Following discussions at the Bermuda conference and within UKOTCF, work started on the development of a proposal to support a regional project to address invasive species threats across the South Atlantic Territories. After some three years of hard work, EU funding was finally secured and the project got underway in late 2006.

The project involves all five UKOTs in the South Atlantic (St Helena, Ascension, Tristan da Cunha, the Falkland Islands and South Georgia & the South Sandwich Islands) with two principal NGO partners (Falklands Conservation and the St Helena National Trust). St Helena is the lead government for the project, which is being implemented by the RSPB. The overall objective is to conserve native biodiversity, and therefore enhance economic prosperity and quality of life for people living on the South Atlantic Overseas Territories

Although the approach of the project is regional, enhancing the potential for co-operation on common challenges, it is clear that each of the five UKOTs has unique characteristics; consequently, cross-sectoral Steering Groups are being formed in each Territory. Baseline information on non-native species, and the systems and capacity in place to deal with species invasion threats, is being collated. This will inform the work of Steering Groups in developing action plans and identifying key issues to be taken forward by the project. Anticipated next steps will involve (according to local priorities):

- Building capacity (enhancing training and local employment opportunities where possible);
- Enhancing infrastructure and systems (e.g. quarantine facilities);
- Eradication/control of key species;
- Awareness raising activities;
- Fund raising for longer-term work.

In the longer term, it is planned to hold a regional conference, develop a regional strategy and early warning system, produce a range of facilitating materials, and maintain and develop contact with other regional initiatives of this kind.

For further information, contact Clare Miller at RSPB ([clare.miller@rspb.org.uk](mailto:clare.miller@rspb.org.uk)).

to participate in the latter still requires clarification. Colleagues in the French Committee of the IUCN have also been developing an initiative on invasive alien species for the French overseas territories (see Palasi & Soubeyran, this volume). A number of Territory-focussed projects on invasive species in the UKOTs are also underway (see summary papers in these Proceedings and recent issues of *Forum News*).

The general literature on invasive species has also been growing. Regional reviews of various kinds have included those for the Caribbean (Kairo *et al.* 2003a, b; Lopez & Krauss 2006), the Austral-Pacific (Shine *et al.* 2003a, b), the Western Indian Ocean (Mauremootoo 2003), South and Southeast Asia (Pallewatta *et al.* 2003a, b), Southern Africa (Macdonald *et al.* 2003a, b), Western Africa (CAB International 2004) and South America (Ziller *et al.* 2005a, b). New books have been published, for example, on pathways and vectors (Ruis & Carlton

2003), species invasion ecology (Sax *et al.* 2005), management of marine invasives (Hilliard 2005), and reviewing the first phase of the Global Invasive Species Programme (GISP) (Mooney *et al.* 2005). Materials and information available on the Internet have also been growing. A recent Google search on 'alien invasive species' resulted in >1.3 million hits! Useful online resources include those provided by The Global Invasive Species Programme ([www.gisp.org](http://www.gisp.org)), the Invasive Species Specialist Group ([www.issg.org](http://www.issg.org)) and the CBD website ([www.biodiv.org/programmes/cross-cutting/alien](http://www.biodiv.org/programmes/cross-cutting/alien)). For further details on general information sources like these, see Cheesman *et al.* (2003).

Since the Bermuda conference, discussions on invasive species in the UKOTs have tended to focus on the need for mechanisms to prioritise projects (e.g. see Varnham 2006, Annex 2, Section 2). Whilst many of the factors to be considered in building invasive species management infra-

## **Box 2. Mitigating the threats of invasive alien species (IAS) in the insular Caribbean**

Several major species invasions in recent years (e.g. the introduction and rapid spread of the Pink Hibiscus Mealybug *Maconellicoccus hirsutus*) have served to emphasize the regional nature of threats from IAS in the Caribbean. Such invasions pose a significant potential threat to agriculture in the region, as well as to the endemic-rich biodiversity of the Caribbean islands (Kairo *et al.* 2003b). It has been recognised that a region-wide response to the IAS problem is essential in order to maximize benefits from the limited and often scarce resources available. Building on a preliminary assessment of invasive species threats in the Caribbean carried out by CABI in 2002/3 (Kairo *et al.* 2003a), a major regional initiative was designed, based around the following components:

- Development of national IAS strategies;
- Caribbean-wide cooperation and strategy;
- Information and knowledge generation, management and dissemination;
- Prevention of species invasions in terrestrial, freshwater and marine systems;
- Early detection of, rapid response to, and control of, IAS impacts in terrestrial, freshwater and marine systems.

A network of regional partners was established, national consultations were undertaken, and GEF funding was obtained for the initial (PDF-A) phase of the initiative. This supported a regional workshop held in Trinidad & Tobago in January 2007, which refined objectives and arrangements for the overall initiative. In parallel with these activities, CABI also undertook a review of marine invasive species issues in the Caribbean (Lopez & Krauss 2006).

A proposal for the second (PDF-B/PPG) phase of the project has now [September 2007] been submitted to GEF, with implementation anticipated during late 2007 and 2008. The full-scale project arising from the initial phases is anticipated for the period 2008-2012. CABI has always been keen that the Caribbean UKOTs should be involved in this regional initiative, but it is not possible to use GEF funding to support their participation. Unfortunately, a proposal to facilitate their involvement under the fourth round of OTEP was unsuccessful, but efforts to identify resources for UKOT participation continue.

For further information, contact Marion Seier at CAB International (m.seier@cabi.org).

structure are fairly clear (see below), their relative importance for any given Territory will inevitably be determined by the local situation. Similarly, the priority attached to short-term control/eradication projects will be substantially influenced by context-specific factors. It is possible, therefore, that a straightforward, universal mechanism for prioritising projects cannot be developed. Discussions during the Dealing with Alien Invasive Species session at the Jersey conference focussed on general considerations in relation to the prioritisation of projects.

### **Session Overview and Conclusions**

A fundamental requirement for assessing priorities for the management of invasive species threats is baseline information on:

1. Invasive species themselves - those non-native species which are present in, or likely to be introduced into, any given Territory; the actual/potential impact of those species on biodiversity and/or human endeavours;

2. The infrastructure, in a broad sense, which exists locally for invasive species management - prevention of introduction and establishment, as well as control or eradication (including, for example: the implications of adopting particular control strategies - cf. Parkes, this volume; opportunities for 'mainstreaming' invasive species management activities - cf. Mauremootoo, this topic section of volume).

### **Information on non-native species in the UKOTs**

Varnham (2006) provides a foundation resource for information on non-native species in the UKOTs, and there is much potential for enhancing the database produced under this review. Opportunities should be taken to fill existing gaps and to develop the database as a baseline resource. Potential refinements include clearer categorisation of the species listed, e.g. according to the level of threat that they pose in each Territory. Currently, the database includes apparently benign non-native species, as

well as invasive ones (i.e. those that have spread rapidly with negative consequences).

### **Information on infrastructure for invasive species management in the UKOTs**

In most cases, information on the infrastructure which exists for management of invasive species is yet to be collated. However, for example, a recent report on *Biosecurity for the Falkland Islands* includes an important review of infrastructure, as well as key pathways for species introductions. Similar exercises are likely to be conducted for other South Atlantic UKOTs under the project described in Box 1.

Whilst detailed information on infrastructure may currently be lacking for most UKOTs, a range of sources indicate the typical, key features of such infrastructure. These illustrate the breadth and diversity of components that need to be considered when assessing, identifying gaps in, and ultimately enhancing the invasive species management infrastructure. Examples of relevant sources include: the *CBD Guiding Principles* for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species (CBD 2002); the invasive species components of the CBD Work Plan on Island Biodiversity (CBD 2006); the existing Regional Strategy for invasive species management in the Pacific (Sherley 2000).

The same fundamental elements of infrastructure occur repeatedly in these and other documents on invasive species management (see also Table 1 and Figure 1). These are measures to:

- Raise awareness at all levels of society, and across all relevant sectors, including through education programmes;
- Engage all relevant stakeholders in development of policy, management plans etc., and implementation activities;
- Enhance cooperation and communication between relevant sectors and authorities (including within governments);
- Develop and enforce appropriate legislation, voluntary codes of conduct etc.;
- Establish facilities (including technical capacity) for research, monitoring, surveillance and control activities;
- Apply risk assessment to characterise critical vectors, pathways and species;
- Participate in relevant regional initiatives and establish linkages with relevant international instruments.

Importantly, CBD (2002) recognises that implementation of its Guiding Principles is dependent on **availability of resources**. Similarly, Sherley (2000) identifies inadequate funding as a constraint on implementation of the Pacific strategy.

### **Additional guidance on prioritising invasive species projects**

Other key points that have arisen from recent discussions over prioritisation of measures to tackle invasive species in the UKOTs include the following:

#### ***1. Priority should be given to the protection and/or restoration of sites of greatest value***

This is an obvious principle, but one which is very difficult to apply. Value can be assessed in many different ways, all of which are valid: in biodiversity, economic or social terms, for example. It is also important to remember that a given situation may not be seen in the same way from different perspectives. For example, an ecosystem threatened or afflicted by invasive species may be of relatively little value in a global context, but of very great value to a local community. Both perspectives may need to be considered when assessing whether action to protect or restore that ecosystem is a high priority. In general, however, it is likely that prevention/detection measures will be of highest priority where a threatened ecosystem is in relatively pristine condition, and that control/eradication measures will be of highest priority where a damaging species invasion is already well advanced. It is important to ensure with any control/eradication process that adequate thought and funds are allocated to post-control monitoring to ensure non reoccurrence of the alien species, otherwise scarce funds allocated to the initial control/eradication will have been wasted (cf. Point 4 below).

#### ***2. Priority should be given to the most cost effective measures***

Prevention is invariably more cost effective than control (e.g. CBD 2002). However, the success of a good prevention programme (i.e. species invasions do not occur) is inevitably less 'visible' than the success of an eradication programme that leads to the removal of a devastating invasive species and facilitates the reversal of its many negative impacts. Thus, money invested in preventing the establishment of invasive species tends not to show the short-term results that are apparent from



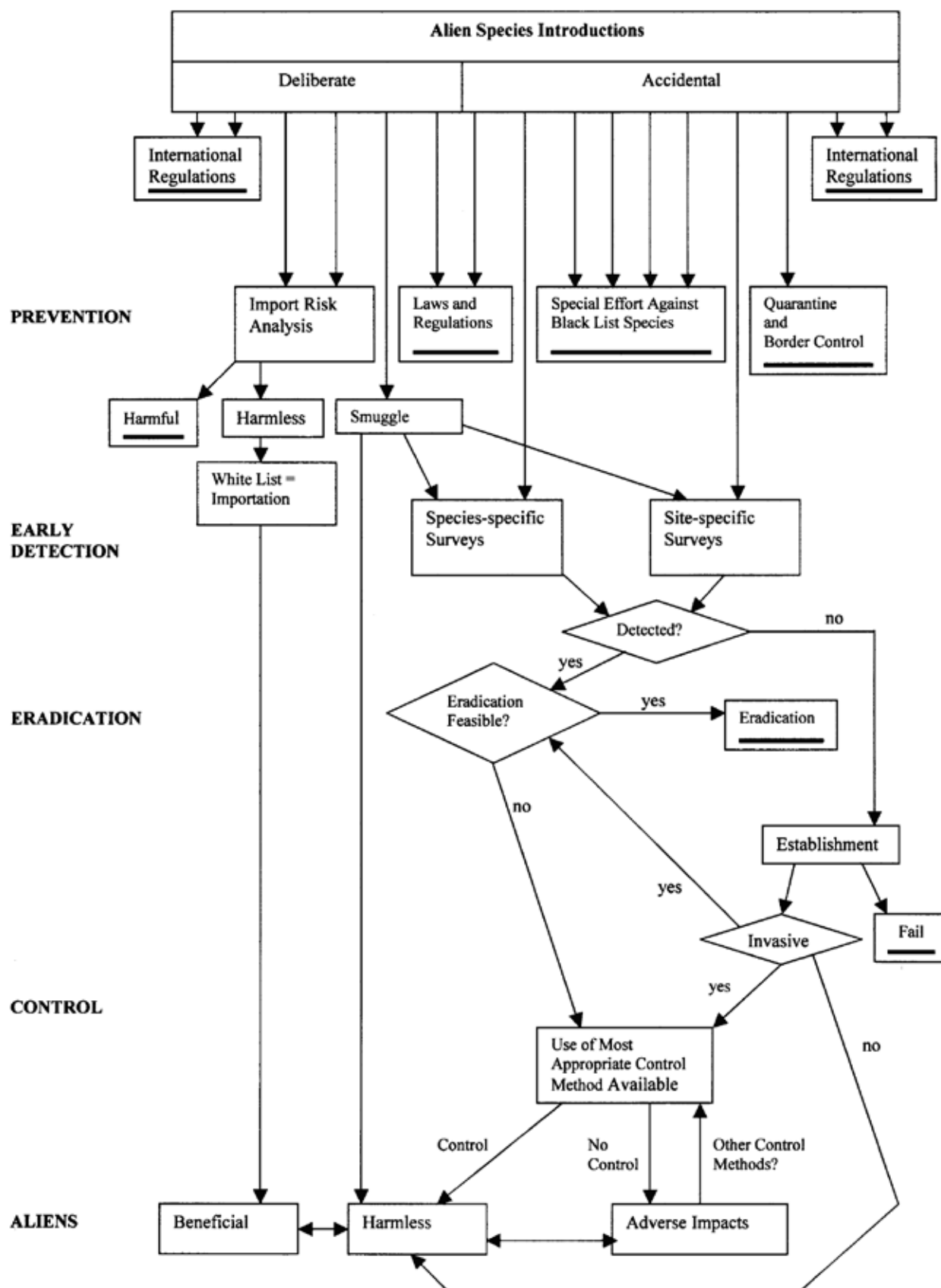


Figure 1. Summary of options to consider when addressing alien species. Black bars mark the potential final stages of introduced alien species. Diamonds symbolise important bifurcations and decision points. From Wittenberg & Cock (2001).

(successful) eradication projects, and investment in prevention may therefore be less attractive to funding agencies despite its greater cost effectiveness (Varnham 2006, Annex 2, Section 2).

	<b>Information/awareness</b>	<b>Prevention/detection</b>	<b>Control/eradication</b>
<b>Strategy</b>	Assess information needs, eg: <ul style="list-style-type: none"> <li>• baseline data on invasive species already present and their impacts</li> <li>• data on potential invasive species threats</li> <li>• co-operation with regional/international bodies</li> <li>• awareness-raising at all levels of society (practitioners, policy makers, public)</li> <li>• obligations under existing regulations/ legislation</li> </ul> Develop strategy to address these needs	Assess prevention needs, eg: <ul style="list-style-type: none"> <li>• identification of key pathways for introductions</li> <li>• risk assessment</li> <li>• cross-sectoral issues</li> <li>• co-operation with regional/international bodies</li> <li>• obligations under existing regulations/ legislation</li> </ul> Develop strategy to address these needs	Assess control needs, eg: <ul style="list-style-type: none"> <li>• which invasive species already present are a) most damaging and b) have greatest potential for successful control/eradication?</li> <li>• control or eradicate?</li> <li>• co-operation with regional/international bodies</li> <li>• obligations under existing regulations/ legislation</li> </ul> Develop strategy to address these needs
<b>Local capacity</b>	Assess local capacity to address information needs, eg: <ul style="list-style-type: none"> <li>• who can establish/maintain databases?</li> <li>• who can undertake/facilitate awareness-raising activities?</li> </ul> Build local capacity to address these needs	Assess local capacity to address prevention needs, eg: <ul style="list-style-type: none"> <li>• who is responsible for implementation of prevention measures?</li> <li>• what limitations exist to enforcement?</li> </ul> Build local capacity to address these needs	Assess local capacity to address control needs, eg: <ul style="list-style-type: none"> <li>• who can undertake control/eradication programmes?</li> </ul> Build local capacity to address these needs
<b>Intervention</b>	Action to address information needs, eg: <ul style="list-style-type: none"> <li>• establish/maintain databases</li> <li>• build information-sharing networks</li> <li>• undertake awareness-raising activities</li> </ul>	Action to address prevention needs, eg: <ul style="list-style-type: none"> <li>• enhance co-operation between implementation/enforcement agencies</li> <li>• enhance prevention mechanisms</li> </ul>	Action to address control needs, eg: <ul style="list-style-type: none"> <li>• control/eradication programmes against particular species</li> </ul>

**Table 1.** Aspects of invasive species management projects. This matrix was developed following discussions on prioritisation of invasive species projects at the UKOTCF Wider Caribbean Working Group in 2003. Rather than indicating where priority should be placed, it was intended to illustrate the range of inter-related issues that projects might be expected to consider.

**3. Priority should be given to measures which demonstrate a holistic approach, and maximise synergies/linkages with other relevant policies and activities**

The many dimensions of the invasive species problem are interlinked – for example, successful prevention or control strategies rely on good co-operation and coordination, which themselves rely on high levels of awareness (cf. Table 1). Key challenges to tackling invasive species in any country arise from the fragmentation of responsibility among different government departments and other

stakeholders, and poor communication between different sectors. Hence, measures which enhance co-operation, coordination and communication between individual initiatives, and between stakeholders, are of particular value in efforts to manage the threats and impacts of invasive species.

**4. Priority should be given to measures which can demonstrate a high likelihood of success**

Projects intended to tackle invasive species issues must be feasible in the short-term and sustainable in the long-term. Increasing experience in the

control/eradication of island invasives (e.g. see Veitch & Clout 2002) suggest that the feasibility of such operations can be assessed, and that many such programmes have a reasonable likelihood of success. However, to ensure that this success is sustained in the longer term, control/eradication programmes should wherever possible also consider measures to restore habitats and prevent re-invasions. This may involve the development of robust prevention and early detection measures, in concert with control activities.

## Conclusions

In planning this session, we had hoped to identify ways of prioritising activities in relation to invasive species – not identifying which species were the most important to control (which is relatively straightforward), but in terms of broader, strategic issues. In fact, there is no simple formula for strategic priority setting. However, the session touched on a number of themes that will undoubtedly be amongst key priorities, as outlined above. In planning the next steps, we perhaps need to consider, in particular:

- Enhanced information gathering and information sharing, including development of the database arising from Varnham (2006);
- An audit of measures that are already in place in each UKOT for invasive species management;
- Planning for better co-ordination of activities, within and between UKOTs, and across the regions in which UKOTs are located;
- The development of rapid response mechanisms.

Perhaps the best approach would be for each UKOT to conduct a Needs Assessment in relation to invasive species, perhaps as part of an audit of measures which are already in place. This approach is consistent with the CBD Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species (CBD 2002). Indeed, CBD (2002, Paragraph 10) urges parties to develop National Invasive Alien Species Strategies and Action Plans, possibly as components of National Biodiversity Strategies and Action Plans, as a basis for identifying national needs and priorities in this area.

## Post-Jersey conference developments

In June 2007, JNCC hosted a workshop on invasive species in the UKOTs, which brought together a wide range of participants from governments,

NGOs and academia. Discussions centred on strategic prioritisation of invasive species projects, regional approaches, development of the UKOTs non-native species database managed by JNCC, and general aspects of the way ahead. Full details of the meeting and its outcomes can be found at <http://www.jncc.gov.uk/page-4081>, however, the main conclusions were:

### *Strategic prioritisation of projects*

- the lack of mechanisms for strategic prioritisation of projects remains a concern;
- mechanisms for strategic prioritisation must consider impacts on biodiversity and socio-economic elements;
- a working group should be formed to take this issue forward, ensuring direct input from UKOTs;

### *Regional approaches*

- regional approaches provide many potential benefits through the pooling of resources, experience and effort (for example, in relation to awareness raising across sectors);
- a working group should be formed to take this issue forward, initially with focus on Caribbean UKOTs;

### *UKOTs non-native species database*

- gaps remain to be filled in the baseline information held in the database;
- additional functionality should be developed according to the needs of users;
- a working group should be formed to take this issue forward.

In addition, the establishment of a working group to consider aspects of awareness raising and stakeholder engagement was proposed.

## References

- CAB International 2004. *Prevention and Management of Alien Invasive Species: Forging Cooperation Throughout West Africa. Proceedings of a Workshop held in Accra, Ghana, 9-11 March 2004*. CAB International, Nairobi, Kenya..
- CBD 2002. Conference of the Parties Decision VI/23: Alien species that threaten ecosystems, habitats or species [incorporating Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species]. <http://www.biodiv.org/decisions/default.aspx?m=cop-06>
- CBD 2006. Conference of the Parties Decision VIII/1: Island Biodiversity. <http://www.biodiv.org/>



- decisions/default.aspx?m=cop-08
- Cheesman, O.D., Clubbe, C., Glasspool, A. & Varnham, K. 2003. Dealing with invasive species: sharing knowledge and experience. In: *A Sense of Direction: a conference on conservation in UK Overseas Territories and other small island communities* (ed. M. Pienkowski), pp. 257-272. UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)
- Defra 2003. *Review of non-native species policy: Report of the working group*. Department for Environment, Food and Rural Affairs, London. <http://www.defra.gov.uk/wildlife-countryside/resprog/findings/non-native/index.htm>
- Hilliard, R. 2005. *Best Practice for the Management of Introduced Marine Pests - A Review*. Global Invasive Species Programme, Cape Town, South Africa.
- Kairo, M., Ali, B., Cheesman, O., Haysom, K. & Murphy, S. 2003a. *Invasive Species Threats in the Caribbean Region*. Report to The Nature Conservancy, CAB International, Trinidad & Tobago. <http://www.cabi.org/images/ias/att760113329.pdf>
- Kairo, M., Cheesman, O., Ali, B.S., Haysom, K., Murphy, S.T. & Berg, C. 2003b. Dangerous invasive species threatening or with a foothold in the Caribbean. *Proceedings of the Caribbean Food Crops Society* 39: 12-22.
- Lopez, V. & Krauss, U. 2006. *National and Regional Capacities and Experiences on Marine Invasive Species, Including Ballast Waters, Management Programmes in the Wider Caribbean Region - a Compilation of Current Information*. UNEP-CAR/RCU, Jamaica. <http://www.cep.unep.org/newsandevents/news/2006/final-cabi-unep-car-rcu-report.pdf>
- Macdonald, I.A.W., Reaser, J.K., Bright, C., Neville, L.E., Howard, G.W., Murphy, S.T. & Preston, G. (eds) 2003a. *Invasive Alien Species in Southern Africa: National Reports and Directory of Resources*. Global Invasive Species Programme, Cape Town, South Africa.
- Macdonald, I.A.W., Reaser, J.K., Bright, C., Neville, L.E., Howard, G.W., Murphy, S.T. & Preston, G. (eds) 2003b. *Prevention and Management of Invasive Alien Species: Proceedings of a Workshop on Forging Cooperation Throughout Southern Africa*. Global Invasive Species Programme, Cape Town, South Africa.
- Mauremootoo J.R. (ed.) 2003. *Proceedings of the Regional Workshop on Invasive Alien Species and Terrestrial Ecosystem Rehabilitation for Western Indian Ocean Island states – Sharing Experience, Identifying Priorities and Defining Joint Action*. IUCN, Gland.
- Mooney, H.A., Mack, R.N., McNeely, J.A., Neville, L.E., Schei, P.J. & Waage, J.K. (eds) 2005. *Invasive Alien Species: a new synthesis*. SCOPE Series 63. Island Press, Washington DC.
- Pallewatta, N., Reaser, J.K. & Gutierrez, A.T. (eds) 2003a. *Invasive Alien Species in South-Southeast Asia: National Reports and Directory of Resources*. Global Invasive Species Programme, Cape Town, South Africa.
- Pallewatta, N., Reaser, J.K. & Gutierrez, A.T. (eds) 2003b. *Prevention and Management of Invasive Alien Species: Proceedings of a Workshop on Forging Cooperation Throughout South and Southeast Asia*. Global Invasive Species Programme, Cape Town, South Africa.
- Ruiz, G.M. & Carlton, J.T. (eds) 2003. *Invasive Species: Vectors and Management Strategies*. Island Press, Washington DC.
- Sax, D.F., Stachowicz, J.J. & Gaines, S.D. (eds) 2005. *Species Invasions: Insights into Ecology, Evolution, and Biogeography*. Sinauer Associates Inc., Sunderland, MA
- Sherley, G. (ed) 2000. *Invasive Species in the Pacific: a technical review and draft regional strategy*. South Pacific Regional Environment Programme, Samoa. [available as a .pdf – paste name of the publication into a Google search]
- Shine, C., Reaser, J.K. & Gutierrez, A.T. (eds) 2003a. *Invasive Alien Species in the Austral-Pacific Region: National Reports and Directory of Resources*. Global Invasive Species Programme, Cape Town, South Africa.
- Shine, C., Reaser, J.K. & Gutierrez, A.T. (eds) 2003b. *Prevention and Management of Invasive Alien Species: Proceedings of a Workshop on Forging Cooperation Throughout the Austral-Pacific*. Global Invasive Species Programme, Cape Town, South Africa.
- Varnham, K. 2006. *Non-native species in UK Overseas Territories: A Review*. JNCC Report No.372. Joint Nature Conservation Committee, Peterborough. <http://www.jncc.gov.uk/page-3634>
- Veitch, C.R. & Clout, M.N. (eds) 2002. *Turning the Tide: the eradication of invasive species: proceedings of the international conference on eradication of island invasives*. IUCN, Gland, Switzerland.
- Wittenberg, R. & Cock, M.J.W. 2001. *Invasive Alien Species: A Toolkit of Best Prevention and Management Practices*. CABI Publishing, Wallingford (on behalf of the Global Invasive Species Programme).
- Ziller, S.R., Reaser, J.K., Neville, L.E. & Brand, K. (eds) 2005a. *Invasive Alien Species in South America: National Reports and Directory of Resources*. Global Invasive Species Programme, Cape Town, South Africa.
- Ziller, S.R., Reaser, J.K., Neville, L.E. & Brand, K. (eds) 2005b. *Prevention and Management of Invasive Alien Species: Proceedings of a workshop on forging cooperation throughout South America*. Global Invasive Species Programme, Cape Town, South Africa.

# Non-native species in the UK Overseas Territories and Crown Dependencies: outcome of a review

**Karen Varnham, Invasive Species Consultant, and Vin Fleming, Joint Nature Conservation Committee, UK**



Varnham, K. & Fleming, V. 2007. Non-native species in the UK Overseas Territories and Crown Dependencies: outcome of a review. pp 201-203 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

A review of non-native species was undertaken, based on a desk study of available data and consultation with individual experts, the first time such an exercise had been attempted for the UKOTs and CDs. The resulting report and database provide valuable baseline information, a key resource in addressing invasive species threats, and have been made freely available through the JNCC website. Numbers of non-native species records from each UKOT/CD vary substantially, according to the level of local survey work undertaken. Small numbers of records often indicate lack of survey work rather than absence of non-native species. Filling of information gaps, regular updating and some refinement will be required if the database is to fulfil its potential value as a tool in support of future priority setting and research.



**Karen Varnham**, 42A Albert Park Place, Montpellier, Bristol BS6 5ND, UK. [kjvarnham@bopenworld.com](mailto:kjvarnham@bopenworld.com); **Vin Fleming**, Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough PE1 1JY, UK. [vin.fleming@jncc.gov.uk](mailto:vin.fleming@jncc.gov.uk)

In 2004 the Joint Nature Conservation Committee commissioned a review of non-native species in the United Kingdom's Overseas Territories (UKOTs) and Crown Dependencies (CDs), the first of its kind (Varnham, 2006). For their size, the UKOTs and CDs contain a disproportionately high number of threatened and endemic species relative to the metropolitan UK. According to the Millennium Ecosystem Assessment (MEA, 2005), invasive species are the biggest threat currently facing the biodiversity of the world's small islands, so gathering baseline information on the nature and scale of this threat is extremely important. This information is a vital first step in assessing the scale of the problem in the UKOTs & CDs and may help, for example, to prioritise which invasive species should be controlled first.

The first phase of the project was a desk study, reviewing the existing literature on invasive species in the UKOTs and CDs. In addition to published material, unpublished reports and papers, many little known outside their particular territories, were a particularly important source of information. In the second phase of the project, the data gathered so far was sent to experts with first hand experi-

ence of the UKOTs and CDs in order to validate the existing information and to add further species records. This second phase proved very successful and resulted in the number of species records in the database more than doubling to almost 3000; important additional information was also collated for many of the existing records.

Although the project had initially been conceived to collect information on 'invasive' species, it became apparent early on that, in most cases, there was simply not enough data available to determine whether most species known to be introduced were actually invasive in the ecological sense. There is no single universally recognised definition of what constitutes an invasive species. However, one useful definition is supplied by the IUCN Invasive Species Specialist Group, which characterises them as: species, usually transported by humans, which successfully establish themselves in, and then overcome, otherwise intact, pre-existing native ecosystems. This distinguishes them from species which have formed self-sustaining populations in the wild but do not cause harmful changes to the nature of the ecosystems around them (usually termed naturalised species). Other introduced species, such

as most ornamental plants, may never form self-sustaining populations at all and remain entirely dependent on humans. Since, in most cases, we did not have the information necessary to decide which species were invasive, we made the decision to include all introduced or non-native species, taking the view that it was better to exclude species at a later date, rather than to miss potentially damaging species simply because there was no accessible data on their invasiveness.

The database consists of an Excel spreadsheet with a page for each territory, plus some additional summary pages. The categories of information held within the database were designed to capture the kind of information necessary to determine whether a species was invasive or was likely to become so. Key areas included distribution and rate of spread, including present and potential distribution, routes of entry and modes of transmission within a territory, known and potential ecological impacts and, finally, details of actions taken or planned to tackle the species in each territory. We were also keen to make the information as relevant as possible to people living or working in the UKOTs and CDs by including local common names as well as internationally recognised scientific names. The database and an accompanying report have been sent to all contributors and are also available as a free download through the JNCC website ([www.jncc.gov.uk/page-3634](http://www.jncc.gov.uk/page-3634)).

The bar chart below (Figure 1) shows the number of non-native species recorded from each UKOT and CD. The most striking result is the number of records from Bermuda, for which the database contains records of 1139 non-native species, almost three times as many as St Helena which, at 414, has the next highest number of records. For two regions, the South Sandwich Islands and the Cyprus Sovereign Base Areas, no non-native species were recorded. However, these raw figures probably do not always present an accurate picture of the numbers of non-native species in each territory. A great many records were available to us from a small number of recent pieces of work which had systematically gathered records, namely: Ashmole & Ashmole (2000) for St Helena & Ascension, Mary Walker (pers. comm.) for plants on Anguilla, and Andy Douse (pers. comm.) for the Falkland Islands. Bermuda has recently carried out an island-wide Biodiversity Project, collecting data about all species present there, native and introduced (see Glasspool *et al.* 2000). Invasive species are certainly a serious problem in Bermuda, but the high number of records collected for this territory is due more to this recent in-depth study. A similar pattern underlies all the territories on the left hand side of Figure 1 – in all cases from Tristan da Cunha upwards, the great majority of the records have come from existing systematic collections of data.

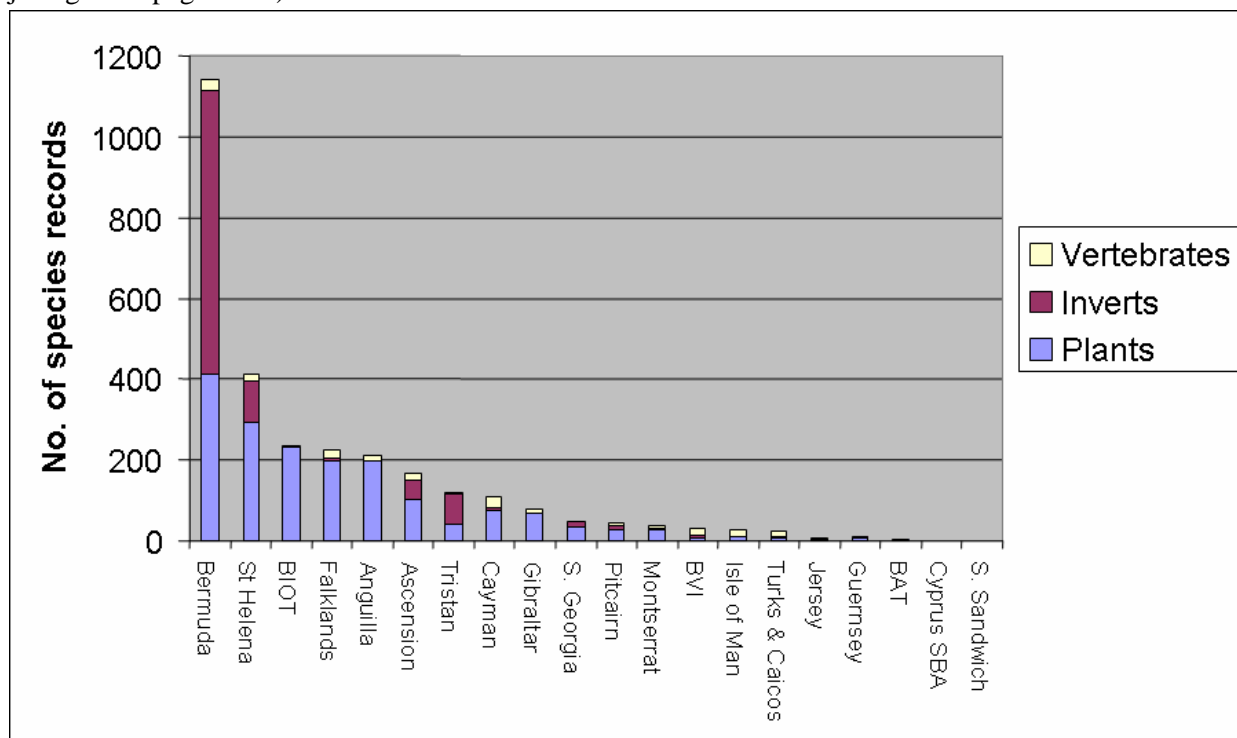


Figure 1. The number of non-native species recorded in each Territory ranked in order of the number of non-native species (BIOT – British Indian Ocean Territory; BVI – British Virgin Islands; TCI – Turks & Caicos Islands; BAT – British Antarctic Territory; SSI – South Sandwich Islands). Source: Varnham (2006)



Territories with fewer records of non-native species are predominantly those for which systematic collections of records were unavailable or inaccessible. For most of these territories we received fairly small numbers of records, usually from one or a few local experts. These records, although small in number, often contained very full and up-to-date information about non-native species, especially the ones known to be causing ecological problems in the territory. This is in contrast to the records taken from systematic lists which, in some cases, had little or no supporting information beyond a scientific name and, perhaps, some sketchy information on distribution. However, for most of the territories on the right hand side of the Figure 1, the numbers of non-native species are probably seriously under-recorded. The exceptions are the British Antarctic Territory and the South Sandwich Islands, for which the figures are based on recent work by the British Antarctic Survey and are believed to be an accurate (but non-natives on South Georgia are probably under-recorded; administratively, South Georgia and the South Sandwich Islands are one UKOT).

This database is just one of a range of resources on invasive species now available. Other database projects, such as the CABI Invasive Species in the Caribbean database (Kairo *et al.*, 2003) and the Global Invasive Species Database (<http://www.issg.org/database>) are also extremely useful sources of complementary information. The unique feature of this project, however, is that the majority of the entries in this database have come directly from people living and working in the UKOTs and CDs and we hope these people will be the ones to benefit from it. Although there are clearly some gaps in information, the database is potentially a valuable tool for sharing information and expertise within the UKOT and CD community. It contains data from a wide range of unpublished written sources, many of which are difficult to access, and thus allows this information to be shared more widely for the first time. The database could also have an important role to play in helping to prioritise which invasive species are posing the biggest threats to biodiversity and hence which should be tackled first. It could also be an important research tool for studying the distribution and effects of invasive species.

So what are the next steps in using this database to inform work on non-native species in the UKOTs and CDs? As with all databases, it will quickly become obsolete if it is not updated regularly.

Accordingly, JNCC are committed to continue to keep this database up to date and to publish periodic updates on the internet. We recognise that this is a two way process, requiring us having to search actively for new information (and we are aware of some datasets that we have missed) but we also hope that colleagues in the UKOTs/CDs may inform us of any new information which becomes available. We are also conscious that the accessibility of the database on the internet could be improved, for example, through better search functions and links to other relevant sources of information and we hope to address these. However, the true value of the database will be realised only if it used to make a practical and tangible contribution to tackling the problem of invasive species in the UKOTs and CDs.

## Acknowledgements

We repeat our gratitude to all those who gave generously of their time and information to contribute to this project.

## References

- Ashmole, P. & Ashmole, M. 2000. St Helena and Ascension Island; a natural history. Oswestry: Anthony Nelson.
- Glasspool, A.F., Sterrer, W., Ward, J., De Silva, H. & Furbert J. 2000. Biodiversity Recording and planning: Bermuda. In: Calpe 2000: Linking the fragments of paradise: *An international conference on environmental conservation in small territories*. (ed. M. Pienkowski), pp 64-68. UK Overseas Territories Conservation Forum (available at [www.ukotcf.org](http://www.ukotcf.org))
- Kairo, M., Ali, B., Cheesman, O., Hayson, K. & Murphy, S. 2003. Invasive species threats in the Caribbean region. Report to the Nature Conservancy by CAB International. Available from [http://www.issg.org/database/species/reference\\_files/Kairo%20et%20al,%202003.pdf](http://www.issg.org/database/species/reference_files/Kairo%20et%20al,%202003.pdf)
- Millennium Ecosystem Assessment. 2005. Ecosystems and human well-being: biodiversity synthesis. World resources Institute, Washington, DC.
- Varnham, K. 2006. Non-native species in the UK Overseas Territories: a review. JNCC Report No. 372. JNCC, Peterborough.

# Non-native species – Current Great Britain Perspectives

Niall Moore, Non-native species Secretariat, CSL



Moore, N. 2007. Non-native species – Current Great Britain Perspectives. pp 204-205 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Due to the growing global problem with invasive non-native species, Defra and the devolved administrations in Scotland and Wales instigated (in 2001) a comprehensive review of policy in this area. The first of the eight key recommendations of this review (see Cheesman & Clubbe, this volume) was the need for more effective co-ordination across Government. Ministers agreed to the establishment of a cross-departmental co-ordinating mechanism for non-native species and this Programme Board was set up in September 2005.

The Programme Board is intended to deliver strategic consideration of the threat of invasive non-native species across Great Britain, and to co-ordinate non-native species policy across Government. It comprises a small and highly focussed Board of key individuals, exercising power and responsibility in their own areas and acting as representatives of wider interests. This approach demonstrates a step-change in the development of ideas and delivery of outcomes on non-natives species issues across Great Britain.

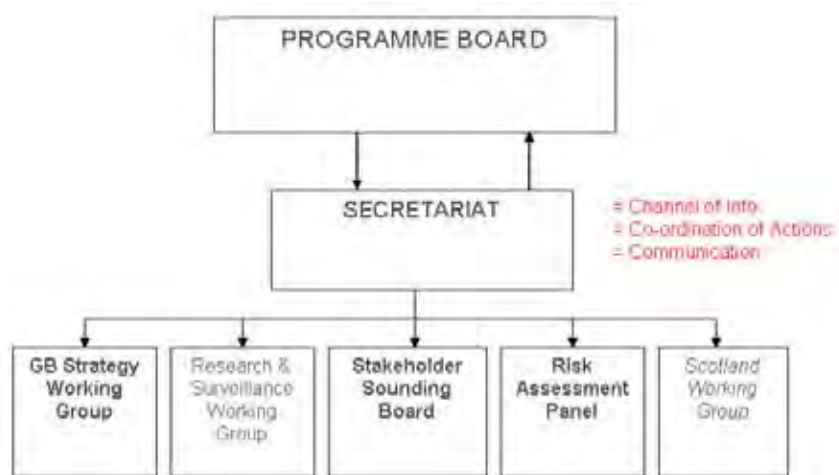
The Board's remit includes:

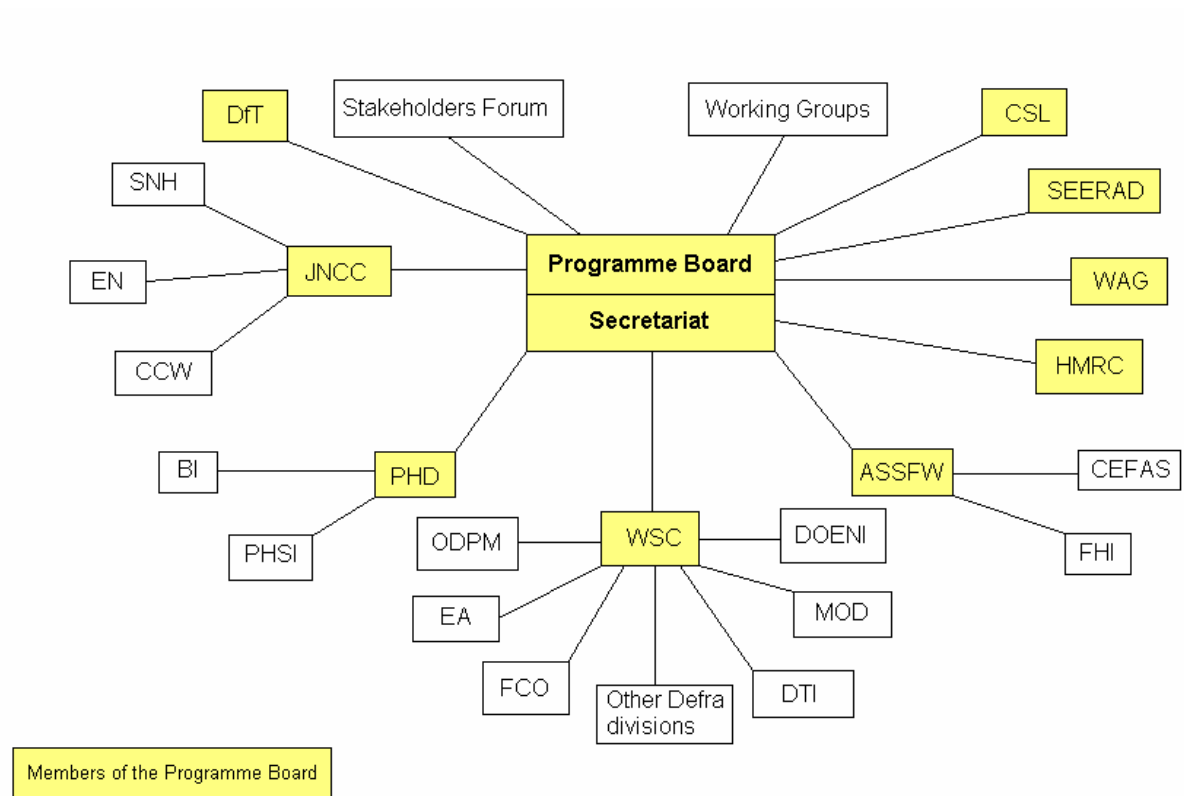
- Developing a vision for addressing non-native species issues
- Coordinating research
- Ensuring the exchange of experience, information and specialist expertise
- Increasing public awareness of the key issues
- Encouraging constructive engagement with industry and other key stakeholders.

The Programme Board is supported in its work by an independent Secretariat, based at Central Science Laboratory (CSL). This secretariat consists of two full-time staff. Current work includes:

- Developing a GB Strategy on non-native species
- Setting up a risk assessment panel
- Setting up a monitoring system for non-native species
- Carrying out rapid reaction (e.g. to recent arrival of the water weed *Ludwigia*)
- Setting up a website.

Niall Moore, Non-native species Secretariat, CSL, Sand Hutton, York YO41 1LZ, UK [n.moore@csl.gov.uk](mailto:n.moore@csl.gov.uk) [nnss@csl.gov.uk](mailto:nnss@csl.gov.uk)







# Initiative on Invasive Alien Species in the French Overseas Territories

Jean-Philippe Palasi, IUCN Office for Europe and Yohann Soubeyran, IUCN French Committee

Palasi, J-P. & Soubeyran, Y., N. 2007. Initiative on Invasive Alien Species in the French Overseas Territories. pp 206-207 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

## Initiative on invasive alien species in the French overseas territories



## "Conserving the diversity of nature"

### A major threat on biodiversity worldwide

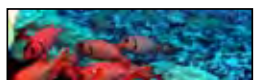


According to IUCN Red List of threatened species, exotic invasive species are the third global threat on biodiversity in the world. They played a role in half of every extinctions in the past 400 years.

Globalisation of human activities means the phenomenon is increasing very fast. Habitat destruction and global warming are also key factors contributing to the expansion of invasive species.

Invasive species can have dangerous consequences for natural ecosystems and human societies. They impact tourism by reducing landscapes attractiveness, damage agriculture, and can even be a threat for human health in the case of viruses, bacteria and some insects.

### French overseas territories on the front line



French overseas regions and territories host a biodiversity of worldwide importance, with 3450 endemic plants and 380 endemic vertebrates.

They are however very sensitive to introductions of species, in particular in islands, where fauna and the flora often evolved without the pressure of predators or competitors.

#### ***invasive Alien species ?***

*Aliens species whose introduction, installation and propagation threaten indigenous ecosystems, habitats or species with environmental and/or economic and/or sanitary negative consequences.*

*Introduced voluntarily or accidentally, they occur in both terrestrial and marine fields, with a particular impact on insular terrestrial ecosystems.*

With the arrival of humans, many plant and animal species were introduced (for example 2200 plants in Réunion island, 1350 in New Caledonia, 1700 in French Polynesia), and more are still being introduced currently. Some of them are very invasive and aggressive, and become a major cause of biodiversity loss.

**A large number of international cases of combating invasive species show that success is possible. French overseas territories must be mobilized to defend their natural wonders, which are a key element of their cultural identities and economic assets.**



## Building an action network for all French overseas territories

Many actors in overseas territories mobilize against invasive species. In spite of their geographical and ecological differences, French overseas territories are often confronted with common difficulties: weak awareness of the public, poorly accessible scientific data, lack of tools for coordination, unsuited legal instruments, etc.

This program aims to support exchange of information and coordination between all actors involved (NGOs, researchers, national and local authorities). It will be carried out in collaboration with IUCN's Invasive Species Specialists Groupe (ISSG), and will also be a contribution to a key priority of the French Strategy for the Biodiversity adopted in 2004.



### Carry out a review of information

- Scientific : identification of the most dangerous species (biology, distribution, dispersion, impacts, etc)
- Technical : inventory of management and research programs, and good practices
- Legal : evaluation of the existing legal tools and their application



### Improve the diffusion of information

- Organization of a network of exchange between overseas territories
- Publication of a synthesis including a guide of good practices
- Diffusion of data through an online database



### Propose recommendations

- To improve awareness of authorities, NGOs, population, the private sector
- To improve the legal framework for prevention and control of invasions
- To increase the means and funding dedicated to fight invasive species

**The initiative is open to all actors concerned. Its purpose is to reinforce at the same time prevention (awareness, tools) and actions on the ground (coordination, access to data, priorities identification).**



Comité français pour l'UICN  
36, rue Geoffroy Saint-Hilaire  
75005 Paris - France  
[uicn@uicn.fr](mailto:uicn@uicn.fr) - [www.uicn.fr](http://www.uicn.fr)

To get involved, please contact :

Yohann Soubeyran  
Program officer on invasive species  
IUCN French committee  
c/o Cirad - UMR PVBMT  
7 Chemin de l'Irat, Ligne Paradis, 97 410 Saint-Pierre, La Réunion  
[yohann.soubeyran@uicn.fr](mailto:yohann.soubeyran@uicn.fr)

This initiative belongs to a program on French overseas territories developed by IUCN French Committee. Priorities are : improvement of scientific knowledge, analyze and influence on public policies, local capacity building. For more information contact Jean-Philippe Palasi, Program officer for Overseas Territories :  
[jp.palasi@uicn.fr](mailto:jp.palasi@uicn.fr)

With support from :



# Turks and Caicos Islands Invasive Pine Scale

Martin Hamilton, Royal Botanic Gardens, Kew



Hamilton, M. 2007. Turks and Caicos Islands Invasive Pine Scale. pp 208-213 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

An invasive non-native scale insect pest was discovered on Caribbean Pine *Pinus caribaea* var. *bahamensis* in the Turks and Caicos Islands (TCI) in 2005. Since then, it has spread rapidly and caused high levels of mortality to the pine, leading to degradation of habitats. Experience with this devastating pest in TCI emphasises the need for rapid response mechanisms when dealing with invasive species.

**Martin Hamilton**, Royal Botanic Gardens, Kew, Richmond TW9 3AB, UK.  
[m.hamilton@kew.org](mailto:m.hamilton@kew.org)

## The Caicos Pine

The Caribbean Pine *Pinus caribaea* var. *bahamensis* is the national tree of the Turks and Caicos Islands (TCI). It is endemic to the Bahamian Archipelago, but has a disjunct distribution within that area. In the Bahamas, it is restricted to the northern islands of Grand Bahama, Abaco, Andros and New Providence. South of the Bahamas but in the same geographical system, in TCI the Caicos Pine occurs on Pine Cay, Middle Caicos and North Caicos, where it is the key species of the pineyard ecosystem.



*Developing cones, Middle Caicos*

## Infection

In January 2005, during fieldwork for the OTEP-supported project run by the Turks & Caicos Na-

tional Trust (TCNT) and the UK Overseas Territories Conservation Forum, non-native scale insects were first observed and collected on Middle Caicos by personnel from TCNT and the Royal Botanic Gardens (RBG) Kew. In April 2006, scale insects







*Pine tortoise scale* *Toumeyella parvicornis*



*Range of damage on Pine Cay*



*April 2006: Recording & Monitoring*

were recorded and collected on North Caicos, Middle Caicos and Pine Cay.

Initial diagnosis suggested that the rapidly spreading pest was the pine tortoise scale *Toumeyella parvicornis*, a well known species in North America on Pinaceae. If this is the species now occurring in TCI, the infestation represents both a new host record and the first record for the region. [Since the presentation, this has been confirmed.]

The impact of the scale insect is severe, but varies somewhat between sites. Some areas contain no live trees or seedlings; others still support some live pines amongst dead and moribund trees. Infestation levels are high on seedlings in many



*Dead trees on Pine Cay*



*Developing cones on Pine Cay*

areas. In combination with massively reduced cone production by mature trees, this threatens on-going recruitment into the pine population, with the prospect that the tree could be lost altogether from



*"Healthy" trees on Pine Cay*



*Infested pine on Pine Cay*





*Infested/dying trees on North Caicos*



*Martin Hamilton and B. Naqqi Manco observing seedlings, Middle Caicos*



*Scale on seedling, North Caicos*



*Infested seedling, Middle Caicos*



*Monitoring tape applied to pine branches, North Caicos*



*Dead trees, Middle Caicos*



*Collecting sampling tapes, Middle Caicos*



ArcView GIS 3.3a

File Edit Table Field Window Help

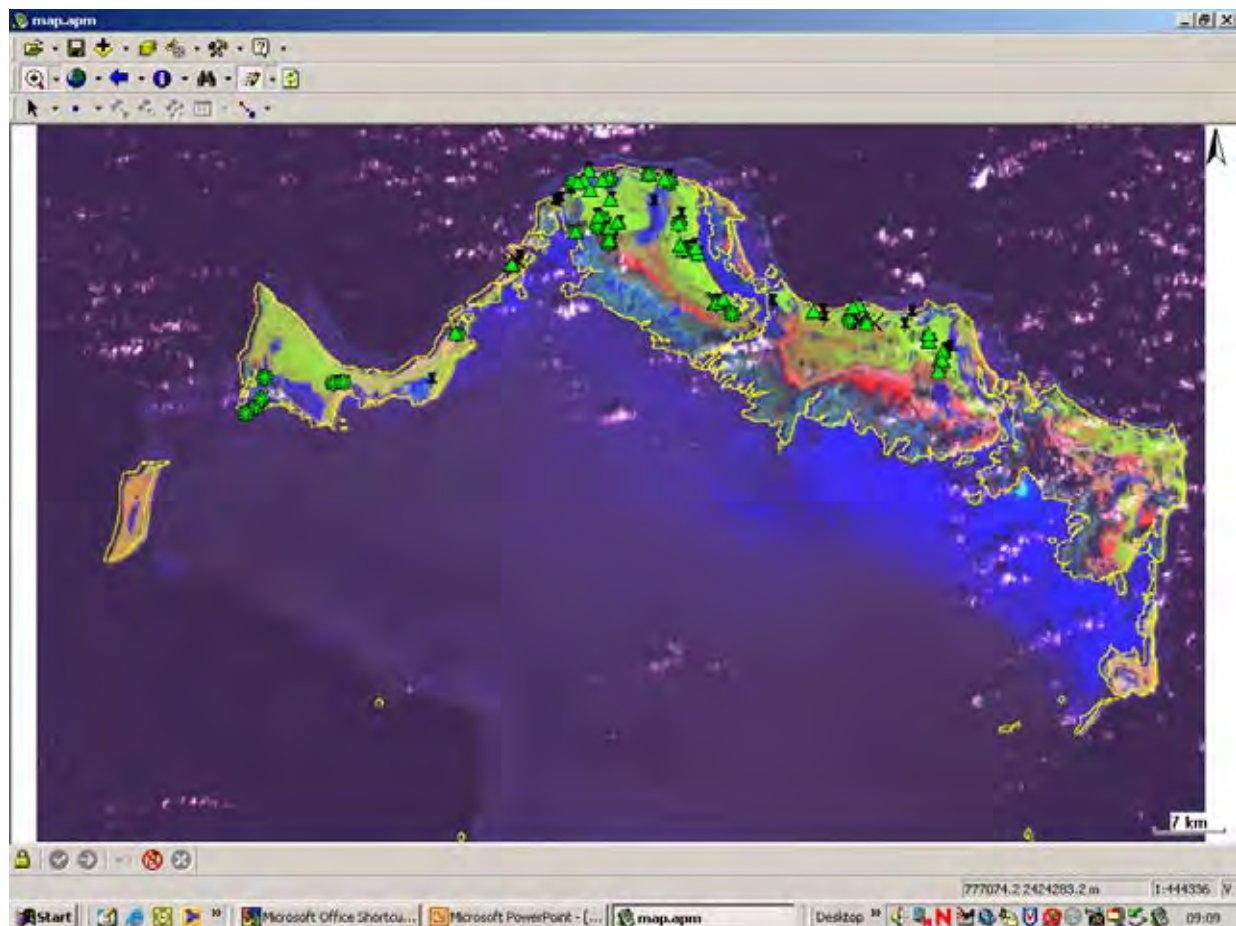
1 of 32 (selected)

pine\_scale\_pp.dbf

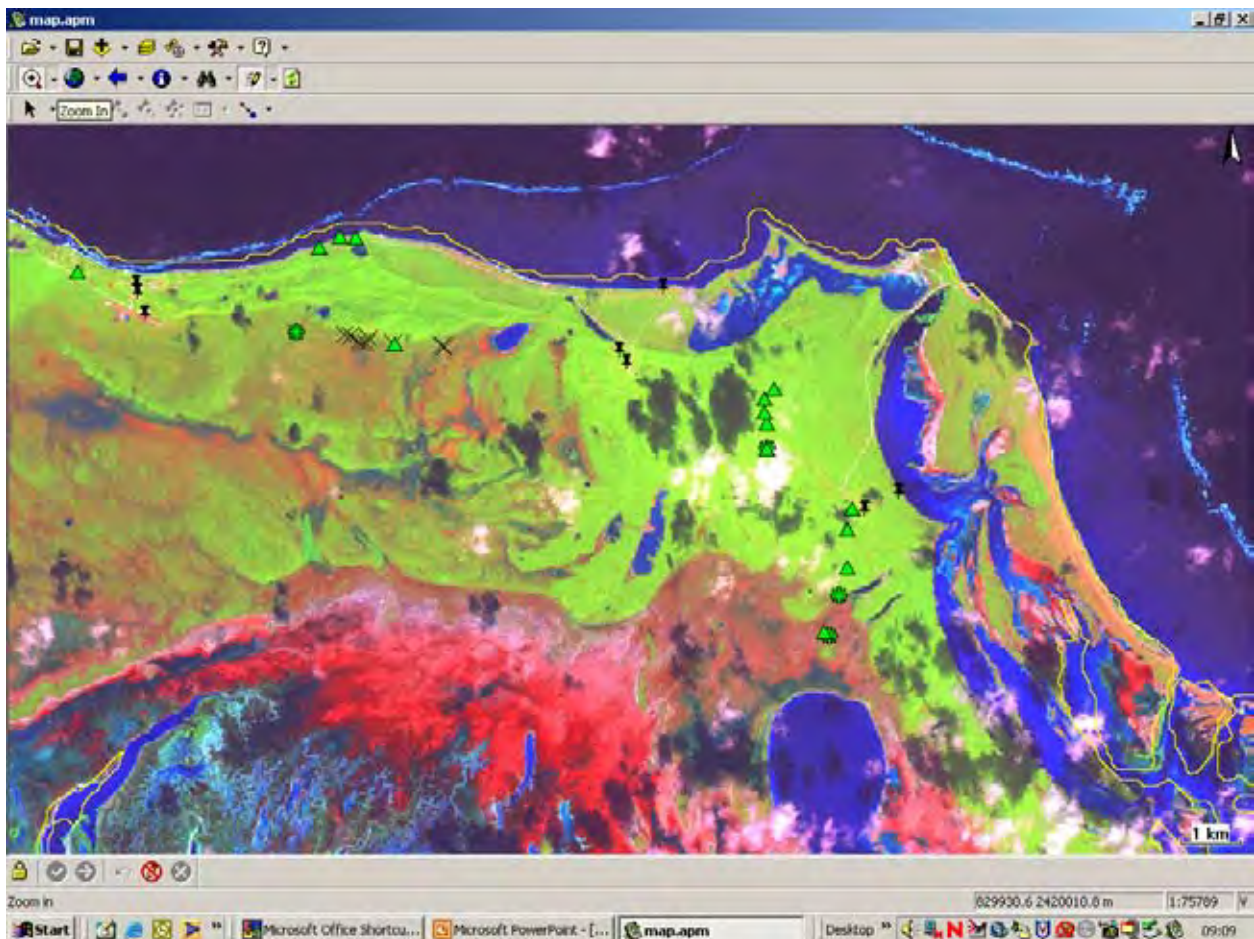
Mapname	Mapsource	Location	Scale	Depth	Canopy	Pinus	Cover	Sample	Age	Notes	Area
NC	Ready Money	Ready Money Pineyard	y	3	1	y	y		0	sparsely pines	5
NC	Ready Money	Ready Money Pineyard	y	3	3	y	y		0	range from dead to canopy of	10
NC	Ready Money	Ready Money Pineyard	y	0	5	y	y		0	fire damage	5
NC	Ready Money	Ready Money Pineyard	a	2	4	y	y		0	fire damage	15
NC	Ready Money	Ready Money Pineyard	y	3	3	y	y		0	fire damage	25
NC	Ready Money	Ready Money Pineyard	y	2	4	n	y		0	fire damage	5
NC	Ready Money	Ready Money Pineyard	y	3	2	y	y		0	fire damage	10
PC	Survey marker 12	Pineyard	y	1	0	y	y	y	1	Healthy forest w/ few young sc	0
PC	Survey marker 12	Pineyard	y	3	2	y	y	y	2		5
PC	Survey marker 12	Pineyard	y	2	4	n	y		0		5
PC	Near dock	Pineyard	y	2	4	n	n		0	1 live 4 dead trees	5
PC	Near Cabbage Patch House	Pineyard	y	1	3	n	y		0		5
PC	East road to airport	Pineyard	y	2	3	y	y		0	crowns from 5 to 1	5
PC	East Road to airport	Pineyard	y	3	4	y	y	y	0	lower scrub surrounding trees	5
PC	Airport	Pineyard	y	2	4	y	y		0		5
PC	Airport	Pineyard	y	4	3	y	y	y	3	switches broom	15
PC	Airport	Pineyard	y	4	3	y	y		0		10
NC	Ready Money	Pineyard	y	4	4	y	y		0	previous fire damage	40
NC	Ready Money	Pineyard	y	3	2	y	y		0	young cones	10
NC	Ready Money	Pineyard	y	3	4	n	y		0	fire damage	50
NC	Ready Money	Pineyard	y	2	4	y	y		0	previous fire damage	20
NC	Ready Money	mp	y	3	3	n	y		0	previous fire damage	25
MC	Conch Bar	Pineyard	y	3	2	n	y	y	1	MC sample	15
MC	Bombana	Pineyard	y	3	3	n	y	y	2	2 samples [2 & 3]	5
MC	Conch Bar	Pineyard	y	3	3	n	n	y	20	male (mobile only): solitary tree	50
MC	Conch Bar	Pineyard	y	1	4	y	y		0	all large trees dead	15
MC	Conch Bar	Pineyard	y	2	4	y	y		0	seedlings in seasonal pond	5
MC	Conch Bar	Pineyard	y	3	3	y	y		0	previous fire damage	5
MC	Conch Bar	Pineyard	y	3	3	y	y		0	prev fire dam	35
MC	Conch Bar	Pineyard	y	3	4	n	y		0		45
MC	Conch Bar	Pineyard	y	2	4	y	y		0		5
MC	Conch Bar	Pineyard	y	3	3	y	y		0	previous fire damage	5

Start Desktop 09/12

Above is a screen-grab from ArcView showing a table of data collected during April 2006 monitoring of the pine scale. Below (and part of Middle Caicos at larger scale on the next page) are screen-grabs from ArcPad showing the

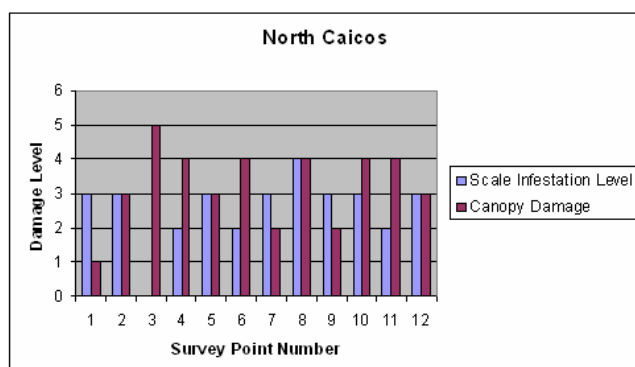
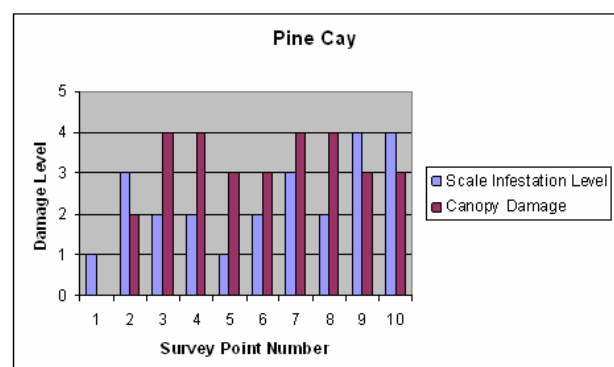
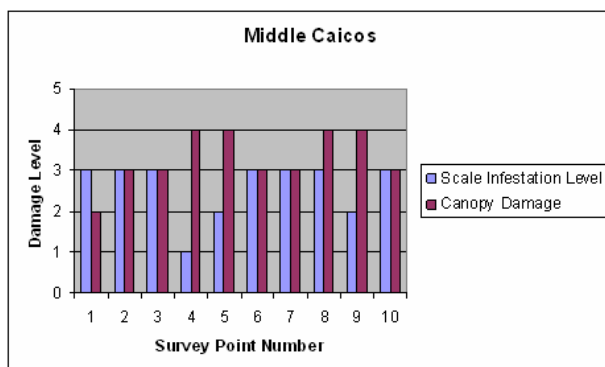






places visited during the April 2006 trip to collect data. Green symbols are either herbarium specimens or vegetation assessment points, black pushpins are places, black "x" scale recording points.

The diagrams below show average infestation levels and canopy damage for the pine trees at the sampling points visited on the three islands



Infestation levels:  
0 = no visible scale  
5 = totally infested

Canopy damage:  
0 = no visible damage  
5 = tree mortality



*Fire ignited by lightening in the pineyard, North Caicos*

many areas. The loss of trees is already resulting in visible habitat degradation in TCI pineyards. As well as further impacts of the pest itself, lightning-induced fires may be more frequent in areas with greater concentrations of dead trees, leading to further losses.

## Recommendations

RBG Kew and TCNT have been working together to develop proposals for measures to tackle the threat posed by this invasive alien insect pest. Key recommendations include:

- Establishment of a nursery
- Establishment of a seedling rescue programme
- Establishment of a seed collecting programme
- Awareness raising throughout TCI (see RBG Kew's poster on its UK Overseas Territories Programme in the section on other topics)
- Control of importation of infected plant material
- Enhanced monitoring of the scale insect and its impacts
- Alerting NGOs and governmental agencies in the region
- Conducting targeted research on the pest
- Evaluation of systemic insecticides for control
- Evaluation of managed burning (for pest control and removal of surplus dead wood)
- Acquisition of funding for on-going work, including:
  - Provision of GIS system for monitoring and mapping
  - Investigation of biocontrol options
  - Education and awareness raising
  - Investigation of prospects for pine reintro-duction.

The speed with which this pest has spread, and the damage that it has already done to the native pine and its associated ecosystem in TCI, emphasises the need for rapid response mechanisms in invasive species management.



*Section of North Caicos pine yard*

# The Repercussions of Hurricane Ivan for Invasive Species in Grand Cayman, Cayman Islands

**Dr Mat Cottam, Cayman Islands Department of the Environment**



Cottam, M. 2007. The Repercussions of Hurricane Ivan for Invasive Species in Grand Cayman, Cayman Islands. pp 214-217 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

In 2004, the Cayman Islands contributed to the JNCC report on Non-native species in UK Overseas Territories (No.372), identifying some 110 locally naturalized / invasive species of flora and fauna. With respect to impact on the natural environment, feral cats, dogs, rats and Green iguanas *Iguana iguana* are probably the most significant faunal invasives. Whistling Pine *Casuarina equisetifolia*, *Scaevola sericea*, Wild Tamarind *Leucaena leucocephala* and Logwood *Haematoxylum campechianum* are the most significant floral invasives. The long-term on-island persistence of these species has contributed to public acceptance: a shifting-baseline which complicates control efforts and the effectiveness of awareness raising.

Hurricane Ivan impacted both native and non-native species. High winds and heavy seas destroyed significant areas of coastal forest, especially along the southern shore of the island. Additionally, large areas of damaged vegetation were bulldozed, prior to potential regeneration. This combination of natural and mechanical clearance contributed to large areas of disturbed ground being opened-up for colonization by invasive species.

Biological surveys indicate that Grand Cayman's bat population was reduced by some 84%, with many bird species suffering similar or even greater losses. In the wake of the storm, the evacuation of over 10,000 inhabitants contributed to the abandonment of many domestic pets.

Damage to mangroves was exacerbated in some areas by the interruption of natural drainage channels by road developments. The resultant standing floodwater drowned large areas of trees. An almost total loss of the island's greenery contributed to an increased public interest in the value of native trees, especially mangroves. However, limited capacity contributed to emergency priorities overriding long-term environmental management, compromising opportunities to capitalize on the storm's temporary impact on invasive flora. Two years later, invasive flora are significantly more widespread than prior to the storm.

Towards initiating practical control of invasive flora, the Department of Environment is working with the Queen Elizabeth II Botanic Park and Darwin Initiative partners to establish a native tree nursery: encouraging the public to plant with native species, and generating stock for restoration of native landscapes. The implementation of improved conservation programs is also a key focus, including the Royal Botanic Gardens Kew Millennium Seedbank Project.

Invasive species present an ever-evolving issue for the Cayman Islands. In 2006, Pink Hibiscus Mealy Bug established for the first time in Grand Cayman.

**Dr Mat Cottam**, Special Projects Officer, Cayman Islands Department of the Environment, PO BOX 486GT, Marco Giglioli Building, Grand Cayman, Cayman Islands Tel: +1 (345) 949 8469 Fax: +1 (345) 949 4020 [Mat.Cottam@gov.ky](mailto:Mat.Cottam@gov.ky)





*Scaevola*  
*Scaevola sericea*

### Before Hurricane Ivan

The 2006 JNCC report by Karen Varnham indicates some major invasive species:

Non-native *Scaevola* *Scaevola sericea*, used for green coastal landscaping

Whistling Pine *Casuarina equisetifolia*, shade tree and “whistling needles”

Logwood *Haematoxylum campechianum*, used in the dye trade

Wild Tamarind *Leucaena leucocephala*, possibly an accidental introduction.

The OTEP-funded Cayman plants Red List was completed in 2006, showing:  
Critically Endangered – 83 taxa  
Endangered – 64 taxa  
Vulnerable – 45 taxa  
Near-Threatened – 6 taxa  
Least Concern – 131 taxa  
Date-Deficient – 86 taxa.



*Whistling Pine* *Casuarina equisetifolia*

Public perceptions to non-native species before Ivan included shifting baselines; invasive species insinuated themselves into the local environment – and also into local culture.

### Hurricane Ivan

Hurricane Ivan struck Grand Cayman on 12th September 2004. It exposed Grand Cayman to hurricane category 4-5 force winds for many hours. High seas and giant waves impacted the south coast, and torrential rain contributed to the majority of the island being underwater during this period.



### Darwin Initiative

At the time that Ivan struck, a Darwin Initiative application was in preparation. This was rewritten to take account of the impact of the hurricane and need for new environmental assessment. It was





successful in acquiring funding for updated habitat mapping and production of a National Biodiversity Action Plan (NBAP) for the Cayman Islands.

### After Ivan

There was extensive loss of, and damage to, surviving vegetation: loss of leaves, branches, thrashing effect, salt-water inundation, and standing water.



There were impacts on invasive species. Some were positive, such as:

- Toppling of Casuarinas
- Increased public interest in the value of mangrove for storm protection.



Many others were negative:

- “Brown island” – leads to desperation for any greenery
- Large areas of native vegetation lost - damaged vegetation tidied up (by bulldozer)
- Invasives quickly colonised open / “tidied” areas
- No capacity for immediate response... leaving invasive species free to re-establish and more...

### **The current situation**

Black mangrove has been devastated, destroying important nest-sites for parrots. A nest-box scheme has had some limited success.

The Department of the Environment has recently purchased weed wrenches and will enjoy some field-testing on Casuarinas.

Removal will be futile if replanting with native species is not undertaken immediately, due to top-up effects from neighbouring properties.

There is work on improving and developing new conservation programmes at QEII Botanic Park, in partnership with Royal Botanic Gardens Kew e.g. Native Tree Nursery and Millennium Seed Bank.

These provide practical alternatives to non-native landscaping, and stock for replacement of invasive species.



# Intervention strategies in pest control

John Parkes, Landcare Research



Parkes, J. 2007. Intervention strategies in pest control. pp 218-219 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Pest control requires both the tools and the knowledge of where and when to use them, in particular for tools that require an 'on' and 'off' application. These decisions have to be made in the context of the economics of the intervention, and funds available. This paper describes two eradication case studies to illustrate start-and-stop rules using some elements of risk analysis.

**John Parkes**, Landcare Research, PO Box 69, Lincoln 8152, New Zealand.  
[parkesj@landcareresearch.co.nz](mailto:parkesj@landcareresearch.co.nz)

## Introduction

Pest control requires both the tools to manage the pest (better mouse traps) and the knowledge on where and when to use them. For most pests we have an array of tools from simple traps and rifles, albeit now used with smart technologies such as GPS and radio-telemetry (Campbell *et al.* 2005), through to designer baits and toxins (e.g. Morgan 2004), with even more high technology solutions being researched (e.g. species-specific toxins and genetically-engineered biocontrol agents).

However, for all tools that require an 'on' and 'off' application, the tricky decisions remain on where and when to intervene against the pest – unless of course one has unlimited funds to intervene everywhere all the time! This is essentially a bioeconomic problem if optimal solutions are to be found (Parkes *et al.* 2006).

Managers of pests have three general strategies to consider for pests: doing nothing, sustained control, or eradication. Each of course requires a different set of decisions on intervention. A decision not to intervene against a pest may be made when no tools (or funds) are available to be effective, a sensible decision for say most established marine invasive pests. Optimal intervention under the sustained control strategy requires knowledge on how the pest-resource system interacts so that either acute or chronic impacts can be managed (Parkes 1993), or biological thresholds identified and target densities set (Choquenot & Parkes 2001).

Eradication is strategically simpler than sustained control as it is not necessary to understand these complex interactions. Intervention is based on some analysis of feasibility (e.g. Parkes 2006) and a decision to stop is based on achievement of zero pests.

In this paper, I will use two eradication case studies to illustrate start and stop rules using some elements of risk analysis.

## Eradication of red deer from Northland, New Zealand

### The problem

The Northland region of North Island in New Zealand is free of wild deer *Cervus elaphus* but has 58 farms where a total of 12 520 deer were held in the late 1990s (Fraser *et al.* 2003). Managers of the conservation estate consider these exotic deer a pest, and farmers are concerned that wild deer present risks to the bovine TB-free status of the region.

Between 1993 and 1999, deer escaped from these farms on 27 occasions with 26% of the farms reporting at least one event. A mean of 13 deer were involved per event (range 1 to 270 animals). In 85% of events the animals were recaptured and in all the rest the escapees were shot by government employed hunters at a cost of c. £30 000 per year.

## A question

Should managers allocate more funds to being proactive or more to being reactive? Proactive management would include enforcing fencing standards, and public relations to encourage good practice and discourage bad practice such as illegal liberations. Reactive management would include surveillance and prompt response to events.

The answer depends on the causes of the escapes and the cost of dealing with them. In this case, the costs of dealing with them are affordable and the problem tractable, so the issue becomes one of cause.

## Results

36% of events were caused by human error (e.g. gates left open by mistake), 30% by “acts of God” (e.g. storm damage to fences), and 33% were caused by manageable flaws (e.g. inadequate fences).

Thus, a rough partition of the funds to match the risk would be to spend 67% on being reactive and only 33% on being proactive.

## Eradication of feral pigs from Santa Cruz Island, California

### The problem

The Nature Conservancy (TNC) has spent a large sum of money (many millions of dollars) attempting to eradicate feral pigs *Sus scrofa* from Santa Cruz Island (25 000 ha) in the Channel Islands of California (Ramsey *et al.* in prep). The hunting contractors (Prohunt Ltd) have removed several thousand pigs since they began in late 2005 but have not killed any, despite large efforts, since mid-2006. The eradication has been politically sensitive and TNC has been forced to spend large sums defending their actions in the courts.

The cost of falsely declaring eradication and paying off the contractor is not large in terms of reacting technically to any future sighting of a pig, BUT the cost in terms of litigation might be fatal to the cause.

### Questions

How certain can TNC be that the string of zero detections equal eradication, or how much more

monitoring with zero detection would achieve a desired level of certainty?

## Results

Ramsey *et al.* (in prep.) have used the hunting data from helicopter hunting, ground hunters with dogs and radio-telemetered Judas pigs to calculate the detection probabilities for each hunting method, i.e., the probability that if a wild pig was present it would be detected on  $x$  occasions by the method. Using Bayes theorem, the probabilities that a pig remains despite the strings of zero detections can be calculated and the risks of false conclusions assessed.

## References

- Campbell, K.J., Baxter, G.S., Murray, P.J., Coblenz, B.E., Donlan, C.J. & Carrion, G.V. 2005. Increasing the efficacy of Judas goats by sterilisation and pregnancy termination. *Wildlife Research* 32: 737-743.
- Choquenot, D. & Parkes, J. 2001. Setting thresholds for pest control: how does pest density affect resource viability? *Biological Conservation* 99: 29-46.
- Fraser, K.W., Parkes, J.P. & Thomson, C. 2003. Management of new deer populations in Northland and Taranaki. *Science for Conservation* 212: 1-30. (available at [www.doc.govt.nz/publications](http://www.doc.govt.nz/publications)).
- Morgan, D.R. 2004. Enhancing maintenance control of possum populations using long-life baits. *New Zealand Journal of Zoology* 31: 271-282.
- Parkes, J.P. 1993. The ecological dynamics of pest-resource systems. *New Zealand Journal of Zoology* 20: 223-230.
- Parkes, J. 2006. Feasibility plan to eradicate common mynas (*Acridotheres tristis*) from Mangaia Island, Cook Islands. Landcare Research Contract Report LC0506/184, 28 p. (available at [www.issg.org/CII/PII/](http://www.issg.org/CII/PII/)).
- Parkes, J.P., Robley, A., Forsyth, D.M. & Choquenot, D. 2005. Adaptive management experiments in vertebrate pest control in New Zealand and Australia. *Wildlife Society Bulletin* 34: 229-236.
- Ramsey, D., Morrison, S. & Macdonald, N. in prep. Quantifying the success of the feral pig eradication program on Santa Cruz Island, California.

# Poster: Invasive species management on islands; raising awareness, generating support, building capacity

John Parkes, Landcare Research

Parkes, J. 2007. Invasive species management on islands; raising awareness, generating support, building capacity. p 220 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

John Parkes, Landcare Research, PO Box 69, Lincoln 8152, New Zealand.  
[parkesj@landcareresearch.co.nz](mailto:parkesj@landcareresearch.co.nz)

## Invasive species management on islands; raising awareness, generating support, building capacity.

### Pacific Invasives Initiative – a regional programme of the Cooperative Initiative on Invasive Alien Species on Islands



The goal of the Pacific Invasives Initiative (PII) is to conserve island biodiversity and enhance the sustainability of livelihoods of men, women and youth in the Pacific. The PII is primarily focused on supporting Demonstration Projects to raise awareness of invasive species impacts and generate support and develop capacity for invasive species management.

The PII is a partnership which acts as a catalyst, coordinator and facilitator for invasive species management; provides and facilitates technical and scientific expertise; promotes and facilitates cooperation, networking and information sharing.

a) Discussing locations for toxic baiting with the work team on Fakaofu Atoll, Tokelau.  
 b) Training for field crew in distributing toxic ant bait in the field on Fakaofu Atoll.  
 c) Tokelaban working alongside Victoria University team member assembling cages for hermit crab research.  
 d) The baiting team, including two quarantine officers, on Nukunono Atoll, Tokelau.  
 (Photos: Karen Abbott)



Erecting a nestbox trap for jungle mynas (*Acridotheres fuscus*) on Tokelau.  
 (Photo: Bill Nagle)



Pacific rat (*Rattus exulans*) bait station training: Viwa Island, Fiji.  
 (Photo: Karen Abbott)

#### Projects supported by the Pacific Invasives Initiative –

- Management of the invasive weed *Mimosa pigra*, Papua New Guinea.
- Multi-species mammal control on Mt Panie, New Caledonia.
- Singapore ant (*Monomorium destructor*) eradication in Hachibei State, Palau.
- Challenging the yellow crazy ant (*Anoplolepis gracilipes*) on Tokelau
- Restoration of the Aleipata Island Group, Samoa.
- Viwa Island restoration project, Fiji.
- Assessment of potential threats to biodiversity from invasive mosquitoes in Tonga.
- Restoration of Vahanga Atoll, Tuamotu Archipelago, French Polynesia.
- Protection of Tanga'eo, the endemic Mangaia (Cook Islands) kingfisher from common myna (*Acridotheres tristis*).
- Phoenix Islands conservation survey, Kiribati.
- Eradication of Pacific rats (*Rattus exulans*) on Vatu'ira Island, Fiji.
- Eradicating rats (*Rattus exulans*, *R. rattus*) from Ahnd Atoll, FSM.
- Feasibility of rat (*Rattus exulans*, *R. rattus*) and other invasive species eradication from Kayangel Atoll, Palau.
- Protection of Tokelau Fakaofu from myna (*Acridotheres* spp.) bird invasion.
- Prospects for biological control of *Merremia peltata*.
- Pacific Ant Prevention Programme.



For more information, visit:  
 Pacific Invasives Initiative  
[www.issg.org/cii/PII](http://www.issg.org/cii/PII)

(Background photo: AK Kepler)





# Working for Water (South Africa) – the Biggest Invasive Alien Species Management Programme in the Developing World

John Mauremootoo, CABI Africa



Mauremootoo, J. 2007. Working for Water (South Africa) – the Biggest Invasive Alien Species Management Programme in the Developing World. pp 221-225 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pi-enkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

This paper describes the South African Working for Water (WfW) invasive alien plant management programme. The background to, and history of, WfW are discussed, as are some of the factors that have enabled the programme to become an example of how IAS considerations can be mainstreamed in developing countries. The applicability of the WfW model to islands in the Western Indian Ocean is examined in regard to a possible WfW style project in Rodrigues.

**John Mauremootoo**, Senior Scientist, CABI Africa, PO Box 633-00621, Nairobi, Kenya e-mail: [j.mauremootoo@cabi.org](mailto:j.mauremootoo@cabi.org)

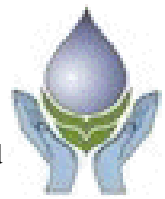
## Introduction and history of the Working for Water programme

Invasive alien plants have become established on over 10 million hectares of land in South Africa. Modeling studies have demonstrated how some lightly infested catchments can become densely infested over a period between 10 and 15 years (Le Maitre *et al.* 1996). This has a serious economic cost, which will rise if timely management is not carried out.

South Africa is a dry country and water scarcity is likely to limit economic growth (Huntley *et al.* 1989). Reviews published in the 1980s and 1990s suggested that invasion of catchments by alien trees in South Africa would seriously reduce water supplies (e.g. Versfeld and van Wilgen 1986). This issue had been long recognized by ecologists but this knowledge had not yet filtered into the consciousness of decision-makers (van Wilgen *et al.* 1996).

In 1995 the argument was put forward by Guy Preston, then a researcher at the University of Cape Town (now National Leader of the WfW programme), that the new post-apartheid government of South Africa should not build dams and water-transfer schemes until catchment management is optimised in ways that are efficient, equitable and sustainable. The then Minister of Water Affairs and Forestry, Kader Asmal (a former university profes-

sor), was convinced by the scientific arguments that clearing of invasive alien plants was central to efficient catchment management. The Fynbos Forum, a collection of academics and practitioners in the Western Cape, was also very instrumental in bringing the issue of invasive species to the attention of key decision makers.



Job creation and the pursuit of social equity were central to the manifesto of the new regime under Nelson Mandela, which came to power in 1994. The Working for Water Programme (WfW) was launched in 1995 as a means of achieving social and economic benefit through an environmental programme. The justification for the programme was also very linked to the protection of biological diversity, the need to stem exacerbating problems associated with fire (as well as flooding, erosion, water quality, etc) and the need to maintain land for productive use.

WfW stands out as a classic example of mainstream-



ing of invasive species management programmes (Cowling *et al.* 2002). These mainstream concerns are encapsulated in the WfW Mission Statement which is as follows: 'The Working for Water programme will sustainably control invading alien species, to optimise the potential use of natural resources, through the process of economic empowerment and transformation. In doing this, the programme will leave a legacy of social equity and legislative, institutional and technical capacity.

WfW focuses on four main areas to support strategies for dealing with the problem of invasive alien plants:

1. Job creation
2. Biological control
3. Public education and communication
4. Creating an enabling legislative environment.

The programme has now grown to the point that its budget for 2003/4 is R442 million (c.\$US68 million at November 2003 exchange rates). It directly employs over 20,000 people in over 300 separate projects throughout South Africa. The programme targets some of the most marginalized groups in South African society including women, single parent heads of households, the youth, the disabled, those leaving prison, and military veterans.

The achievements of the WfW programme have been recognized worldwide. This recognition is reflected in its association with 38 national and international awards.

## Reasons for the success of Working for Water

### Good science

From the outset the programme was based on good science. It was this science that persuaded decision-makers to act in the first place. However, the WfW programme has not waited for absolute scientific proof before acting. In many cases the science that can aid management has been catalysed by the practical work in the field. Typi-

cal of the research catalysed by WfW have been studies on the impacts of invasive alien plants on hydrological regimes (Le Maitre *et al.* 2000), the modeling of management methods at the landscape scale (van Wilgen *et al.* 2000) and research and development in biological control techniques (Zimmermann & Klein 2000). An indication of WfW's role in catalysing research in many disciplines was the first WfW research symposium held in 2003 which presented outcomes of research in hydrology, biological control, ecology, social development, occupational health and safety, and resource and development economics.

### Good marketing

The WfW programme has always marketed itself well. WfW has developed a very distinctive logo that evokes inclusiveness, and progress, areas of great importance for post-apartheid South Africa. The distinctive yellow WfW tee shirts have been worn by countless celebrities at countless photo opportunities. The fact that the programme's patron is Nelson Mandela is indicative of well-placed support. In addition WfW supports, and is supported by, high profile events and campaigns such as Arbour Week, which focuses on indigenous vegetation and 20/20 the Vision Programme that works with the Department of Education to develop water audits in schools.

### Mainstreaming

This has been already highlighted and is a theme that runs throughout the programme. The work carried out under WfW on HIV/AIDS awareness,



the promotion of safe sex and of family planning are illustrative that the thinking of those involved in the programme goes a long way beyond invasive plants (McQueen *et al.* 2000).

### **Creating partnerships**

The programme was established as a multi-departmental initiative led by the Departments of Water Affairs and Forestry, Environmental Affairs and Tourism and Land and Agriculture. Additional national partners now include all government departments but particularly Health and Welfare, Public Works, Provincial and Local Government, Correctional Services, Trade and Industry, Finance, Labour and Arts and Culture. In addition there are international partners with whom WfW has strong links including those dealing with IAS such as IUCN (the World Conservation Union), GISP (the Global Invasive Species Programme) and CABI (Centre for Applied Bioscience International) and regional blocks such as SADC (Southern African Development Community) and NEPAD (the New Partnership for Africa's Development). Partnerships with the private sector are also very strong.

### **High level political support**

As mentioned Nelson Mandela is the patron of the WfW programme. The importance of the support given by Kader Asmal in establishing the programme cannot be underestimated. Indeed it seems likely that without his efforts WfW would not have got off the ground. The continuation of this political support, notably from the Ministers of Water Affairs and Forestry (Mr Ronnie Kasrils), Environmental Affairs and Tourism (Mr Valli Moosa) and Agriculture (Ms Thoko Didiza), has helped to ensure the programme's continued success.

### **Total integrity**

The WfW programme is well known to operate a policy of zero tolerance of corruption. This means that every Rand spent must be accounted for. This can slow down some activities but it sends a clear message to stakeholders. This attitude is made very clear when reading WfW reports that discuss staff dismissals in a very frank manner.

### **The time was right**

The ending of apartheid was probably a necessary but not sufficient condition for the development of WfW. It was this favourable timing together



with some of the other factors discussed above that turned a potential into reality.

### **Challenges for WfW**

This paper discusses the reasons for the success of WfW. It would be naïve to assume that the journey has been, or still is, plain sailing. There are many problems. These include institutional arrangements, a lack of autonomy, unclear decision-making powers, unclear mandates, and adequate staffing. Indeed, it is only through the resolute dedication of many of its staff that WfW has been able to do what it has done. The need for dedication to the cause is very important to bear in mind as if this is not present even the best ideas can be destroyed by bureaucratic inertia, conservatism or downright antagonism.

### **Can we apply this approach regionally – the case for WfW Rodrigues**

Rodrigues, the smaller of the two main islands that form the Republic of Mauritius has enjoyed considerable conservation success over the last few years. To maintain recent momentum it is imperative that existing efforts are scaled up (Mauremootoo, this volume). A WfW-type project to restore the invaded watersheds of Rodrigues using native species is a possible means of achieving this increase in scale. Among the conditions prevailing in Rodrigues (some of which are analogous to those in South Africa) are the following:

#### **Lack of water**

Although almost all houses in Rodrigues are linked to a piped water supply many only receive piped water as infrequently as once per fortnight. Insufficient water is available for agricultural demand and development needs, notably in the tourist sector.





Most water is pumped from groundwater sources that are being used unsustainably.

### **Poverty and high unemployment**

Rodrigues is the least developed district of the Republic of Mau-

ritius with 33% of households, many of whom are female-lead, being classified as poor (<\$1,250 household income per year) and 11% very poor (<\$450 household income per year). Figures are not readily available, but it is well known that unemployment in Rodrigues is considerably higher than the c.10% levels prevailing in the Republic of Mauritius as a whole (CSO 2002).

### **Introduced plants affecting water security**

It is believed that introduced trees, many of which are known to be water-demanding are exacerbating water shortages in Rodrigues. Although data are lacking the morphological characteristics of most native trees (e.g. leathery leaves, slow growth rate, short stature and mainly shallow but wide-spreading roots) appear likely to make native trees relatively water-efficient. Many of the species that are known to be water-demanding are also highly invasive in Rodrigues so it seems likely the problem of water-demanding trees will increase if nothing is done.

### **Overfishing in lagoon**

The Rodrigues lagoon is highly overfished. In 2001 c.2,000 Rodriguans were registered as fishers (AFRC 2001). Some of their income comes from fishing but in many cases the majority comes from a Government bad weather allowance, which serves as a form of social security. A certain number of days per year must be fished if fishers are to qualify for the allowance. Many of these are women who trample the lagoon to spear octopus.

Octopus is highly overfished and trampling further damages the lagoon ecosystem as a whole. A labour-intensive forest restoration programme could help remove the need to overfish for octopus while at the same time having a positive effect on the environment.

### **Models for restoration can be scaled up**

The restoration work undertaken in Rodrigues in the last few years has provided a model that can be extended to larger areas given sufficient funding, manpower and technical support.

### **A new political regime**

Although it is not comparable with the ending of Apartheid in South Africa, the coming of regional autonomy in Rodrigues in 2002 was a very significant step for the island. The locally elected regional assembly is headed by a chief commissioner for the island. The chief commissioner, commissioners for key areas (analogous to ministers at the national level) and the assembly are responsible for day-to-day governance of the island. Clearly the new regime is anxious to make a decisive and positive impact on the day to day life of the island. An environment project that addresses social and economic concerns clearly has great potential in this respect.

### **Can we apply the model to other islands in the Indian Ocean region?**

It is unlikely that most islands in the IOC region will have such similar circumstances to South Africa as those currently prevailing in Rodrigues. In the relatively wet island of Mauritius for example it would be hard to sell a project for the clearance of invasive alien plants on the issue of water security. However, there might be other entry points that could be utilised to allow an up-scaling of restoration work. In the case of Mauritius it could be





employment generation, much needed for the sugar estate labourers now being laid off because of the increasing mechanisation of sugar cane production. Other islands, no doubt, will have analogous entry points through which IAS management can be mainstreamed. The initiation and implementation of such projects depends on experts in specialist fields making the effort to show that their work is relevant to the wider society of which they are a part. If this can be done IAS management can be carried out on the scale necessary to make efforts ecologically and financially sustainable in the highly invaded islands of the Western Indian Ocean.

## Acknowledgement

Many thanks for Guy Preston for providing useful information on the work going on in South Africa and on his helpful comments on an earlier version of the manuscript.

## References

- AFRC 2001. *Annual Report of Ministry of Fisheries*. Ministry of Fisheries, Albion.
- Cowling, R.M., Sandwith, T. & Mackinnon, K. 2002 *Mainstreaming Biodiversity in Development: Case Studies from South Africa*. The World Bank, Washington, D.C.
- CSO 2000. *Economic and Social Indicators Issue No. 369, March 2002 - Environment Statistics Year 2000*. Central Statistics Office - Ministry of



- Economic Development, Financial Services and Corporate Affairs, Port Louis, Mauritius.
- Huntley, B., Siegfried, W.R. & Sunter, C. 1989. *South African environments into the 21st century*. Human and Rosseau, Cape Town.
- Le Maitre, D.C., Versfeld, D.B. & Chapman, R.A. 2000. The impact of invading alien plants on surface of water resources in South Africa: A preliminary assessment. *Water SA*, 26, 397-408.
- Le Maitre, D.C., van Wilgen, B.W., Chapman, R.A. & McKelly, D.H. 1996. Invasive plants and water resources in the Western Cape province, South Africa: modeling the consequences of a lack of management. *Journal of Applied Ecology*, 33, 161-172.
- Mauremootoo, J.R., Watt, I., & Towner-Mauremootoo, C.V. in press. Institutional capacity for conservation in Mauritius and Rodrigues. In: R. Edmond, O.L. Langrand & C. Galindo-Leal. *State of the Hotspots, Madagascar and Indian Ocean Islands*. Conservation International, Washington D.C.
- McQueen, C., Noemdoe, S. & Jezile, N. 2000. The Working for Water Programme. pp. 51-54. In: Preston, G., Brown, G. and E. Van Wyk, eds. *Best Management Practices for Preventing and Controlling Invasive Alien Species*. Working for Water Programme, Cape Town.
- van Wilgen, B.W., Richardson, D.M., & Higgins, S.I. 2000. Integrated control of invasive alien plants in terrestrial ecosystems. pp. 118-128. In: Preston, G., Brown, G. and E. Van Wyk, eds. *Best Management Practices for Preventing and Controlling Invasive Alien Species*. Working for Water Programme, Cape Town.
- Versfeld, D.B. & van Wilgen, B.W. 1986. Impacts of woody aliens on ecosystem properties. pp. 239-246. In: R.M. Cowling, ed. *The ecology and control of biological invasions in South Africa*. Oxford University Press, Cape Town.
- van Wilgen, B.W., Cowling, R.M., & Burgers, C.J. 1996. Valuation of ecosystem services: a case study from South African fynbos ecosystems. *Bioscience*, 46, 184-189.
- Zimmermann, H.G. & Klein, H. 2000. The use of biological control agents for the control of plant invaders and the importance of partnerships. pp. 130-138. In: Preston, G., Brown, G. and E. Van Wyk, eds. *Best Management Practices for Preventing and Controlling Invasive Alien Species*. Working for Water Programme, Cape Town.

# Poster: An assessment of the potential for rodent eradication in the Tristan da Cunha Islands Group

Geoff Hilton, RSPB



Hilton, G. 2007. An assessment of the potential for rodent eradication in the Tristan da Cunha Islands Group. pp 226-228 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

An OTEP project, managed by the Tristan da Cunha Natural Resources Department, Royal Society for the Protection of Birds & University of Cape Town.

**Geoff Hilton**, Royal Society for the Protection of Birds, c/o Sociedade Portuguesa para o Estudo das Aves (SPEA), Rua da Vitória nº 53, 3º Esq., 1100-618 Lisboa, Portugal. [geoff.hilton@rspb.org.uk](mailto:geoff.hilton@rspb.org.uk)

## Project Background

Tristan da Cunha is the most important UKOT for biodiversity conservation, holding the highest numbers of endemic and globally threatened species. The archipelago is perhaps the most important breeding site for seabirds in the world, holding millions of pairs of over twenty species, including three endemic species. There are also five endemic landbirds, and numerous endemic plants and insects.

The two largest islands in the Tristan da Cunha group – Tristan da Cunha and Gough Island, have introduced rodents – Ship Rats *Rattus rattus* and House Mice *Mus musculus* on the former, and house mice only on the latter. Introduced rodents have devastating effects on the biota of oceanic islands, and are the primary cause of historical bird extinctions. They are thought to have had, and to continue to have, a profound impact on the biodiversity of Tristan and Gough. The Gough Island World Heritage Site is under threat of losing the biodiversity values for which it was inscribed. The draft Tristan da Cunha Biodiversity Action Plan, produced through stakeholder workshops in Tristan and the UK, cites rats as the most important negative factor operating in the terrestrial environment, and recommends an assessment of potential actions to remove this threat. The revised Gough Island Nature Reserve Management Plan cites mice as a major negative factor affecting the island's biota. Consequently, the Natural Resources Department of Tristan has requested that an investigation into possible responses to this problem be carried out. An assessment of the options for reducing or

removing the impact of rodents on these islands is being produced, with the aim of preventing further biodiversity losses, and permitting restoration of native ecosystems.

## Activities and Results

### 1. A Review of the Impacts of rodents on Tristan da Cunha and Gough

A desktop synthesis of what is known, and can be inferred about the overall impact of rodents on the islands has been produced. This includes historical impacts, ongoing impacts and likely future impacts, as well as assessing the benefits for biodiversity conservation of reducing rodent impacts. It also indicates significant gaps in information that require new fieldwork. This Review will shortly be formally published in the RSPB Research Report Series (contact Geoff Hilton for a copy).

The rats on Tristan da Cunha (in combination with predation by cats and humans, which has now ceased) are thought to have greatly reduced the size of seabird populations, which were once massive, but are now very small. Some seabird species are probably already extirpated from the island. Rats may also have been responsible for the extinction of two endemic landbirds. Very little is known about the impacts of rodents on the native biota of the island. Although very under-studied, it seems probable that the Ship Rat on Tristan has led to local population reductions and possibly extinctions of native plants (especially tussock grass) and invertebrates. No recovery of native biota can be foreseen without removing rat impacts. Rapid



recovery and recolonisation of native biota is likely if rat impacts are removed.

Gough Island is in a more natural state than Tristan, and historic rodent impacts are far less obvious. Ongoing and future impacts are however, much more severe. Impacts on plant and invertebrate communities are as yet unknown, but are thought likely to occur, based on studies from other islands. Two species of endemic flightless moths may be at particular risk. The House Mouse on Gough has been recorded preying upon and killing chicks of the Endangered Tristan Albatross *Diomedea dabbenena*, Vulnerable Atlantic Petrel *Pterodroma incerta* and Great Shearwater *Puffinus gravis*. Circumstantial evidence suggests strongly that it also preys upon eggs and chicks of the Vulnerable endemic Gough Bunting *Rowettia goughensis*. Breeding success of both the albatross and the petrel are too low to sustain their populations. Impacts on other bird species are currently unknown, but are predicted to occur to all the winter-breeding species (when avian material peaks in mice stomachs), as well as to the smaller burrowing petrels, especially the storm-petrels and Common Diving-petrel *Pelecanoides urinatrix*. If the House Mouse is removed from Gough Island, recovery of impacted flora and invertebrates is expected, and a recovery of affected bird populations is expected, leading to an improved conservation status, as well as the maintenance of plant and invertebrate communities indirectly through manuring and burrowing activities.

In conclusion, rodents (in conjunction with other anthropogenic factors) have destroyed much of Tristan's biodiversity interest, especially seabirds, but there is potential for recovery of most populations over time if rodent impacts are removed. On Gough, the impacts of mice are perhaps as severe, but are yet to be fully played out, with massive population reductions and extirpations forecast for the future. Again, a major recovery is expected if mouse impacts can be removed.

## **2. An assessment of the feasibility of available options, with identification of preferred option**

An expert consultant was recruited to conduct a full feasibility study for Tristan da Cunha in 2005. He made a site visit, as well as inspecting relevant facilities in Cape Town (the port of boat departure for Tristan). He assessed various options, namely: (1) begin planning for an eradication of rats or rats and mice; (2) strengthen biosecurity/quarantine

arrangements to prevent further introductions; (3) localised, ongoing control of rodents in key sites where their impact on bird populations is particularly important; (4) conduct all necessary background research, and then wait (e.g. for 10-20 years) for improvements in rodent control/eradication technology. This Feasibility Study is available as an unpublished report from Geoff Hilton.

The consultant was unable to visit Gough Island in person. Based on discussions with biologists who had worked there, and analysis of key features of the island (size, terrain, biota, climate, human population and livestock), the consultant produced an interim feasibility study for Gough, but reported that a site-visit was necessary to confirm his conclusions. The draft feasibility study for Gough is included with the Tristan study.

A site visit to Gough, with a view to producing a formal and definitive feasibility study, will take place in September 2007.

The Tristan Feasibility Study concluded that the eradication of rodents is likely to have significant ecological, financial and social benefits for the island, far greater than any practical level of on-going control. The eradication of rats and mice from Tristan appears technically feasible, but presents significant challenges, with an unprecedented combination of issues. The prospects for successful eradication appear to be very high for Ship Rats and possible, but with a lower expectation of success, for House Mice. If successful, it would be the largest island from which either Ship Rats or House Mice, or the two in combination, have been eradicated, although larger islands have been cleared of Norway Rats *Rattus norvegicus*. Aerial broadcast of cereal-based pellets containing the anticoagulant toxin brodifacoum using helicopters equipped with bait-dispensing buckets and Differential GPS would be used. There are particular issues related to potential effects on the human inhabitants of the island, on their livestock, and on several important wildlife species. There are also issues surrounding anthropogenic food resources for commensal rodents and quarantine measures. All these issues must be managed and overcome, with full community support, before any eradication is attempted. A preliminary estimate of costs of an eradication operation on Tristan is in the order of £ 1.5 to 2 million.

The interim Feasibility Study for House Mice on Gough concluded that in order to protect the

globally important Tristan Albatross and Atlantic Petrel populations the eradication of mice from Gough is desirable, and the most practical long-term solution to the current problem of mouse predation. Aerial broadcast of brodifacoum would again be required. Gough Island presents significant challenges for potential mouse eradication. It is considerably larger than any island successfully cleared of the House Mouse to date, while it also has significant issues in relation to its isolation, climate and behavioural aspects of its mouse population. There are more unknown aspects surrounding the eradication of mice from islands, largely because less experience has been accumulated in mouse eradication technology. There are significant potential risks to some non-target species.

### **3. Produce a detailed, costed plan of action for preferred option**

Having reached a consensus at the stakeholder workshop (see below) that eradication of rats on Tristan da Cunha was feasible and desirable, the external consultant was contracted to produce a detailed Operational Plan to conduct such a programme.

This Operational Plan, currently in late-draft form, describes the planning, eradication and follow-up stages. It discusses the requirements for the project team, helicopters, ships, poison-bait, bait-sowing, planning and logistics, health and environmental safety, and contingency operations.

If the Gough Island Feasibility Study similarly suggests a clear way forward, a second Operational Plan will be commissioned.

### **4. Develop agreement among stakeholders regarding the preferred options**

A stakeholder workshop was held in Cape Town in October 2005, to review the Feasibility Study for Tristan and the Review of Impacts, evaluate the options, and agree on the preferred course of action. The workshop involved Tristan Natural Resources Department, Tristan Administrator, Tristan Island Council, RSPB, University of Cape Town and the external consultant. The workshop report is available as an unpublished report from Geoff Hilton.

The workshop participants reached consensus that (1) an Operational Plan for the eradication of rodents from Tristan should be commissioned

without delay, using project funding. (2) a visit to Gough by an expert consultant, in order to produce a definitive Feasibility Study for that island, should be urgently organised.

The Tristan Biodiversity Officer (an employee of the Natural Resources Department) will engage with the Tristan Community during 2007 to inform them of the study's results and the implications of potential actions against rodents.

When all Feasibility Studies and Operational Plans are complete – probably in early 2008, a technical expert will visit Tristan to discuss them with the local community. They will be asked to describe the potential benefits and costs of the potential actions, to gauge support, and to answer queries.

### **5. Conduct ecological research on rodents and their impacts to inform planning**

To facilitate the development of a detailed plan, the ecology of the rodent species needs to be well understood. An RSPB Senior Research Assistant and Natural Resources Department staff undertook an initial assessment of rat ecology on Tristan da Cunha in 2005-6. Similarly, on Gough Island, an RSPB-funded PhD (2003-7) and an additional tranche of fieldwork in 2005-6 is addressing these data requirements.

The rodent ecology work on Tristan has confirmed the breeding phenology of the rodent species, which is required information for planning an eradication. It has also determined the relative abundance of rats in different habitats on the island, which helps with planning baiting requirements. It also enhanced our knowledge of the current status of bird species on the island, uncovering various remnant colonies, and establishing ongoing monitoring protocols.

Research into the mouse population on Gough is ongoing. The species reaches unprecedented densities and body size. Diet is complex and seasonally variable. The reasons for localised variation in the extent of seabird predation are being explored. Current investigations into home-range size will help evaluate the poison bait density requirements.

# Poster: An experimental assessment of the impact of rats on the biodiversity of the Centre Hills, Montserrat

Geoff Hilton, RSPB



Hilton, G. 2007. An experimental assessment of the impact of rats on the biodiversity of the Centre Hills, Montserrat. pp 229-230 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Research forming part of the Darwin Initiative project 'Empowering the people of Montserrat to conserve the Centre Hills', managed by the Montserrat Ministry of Agriculture, Lands, Housing and Environment, Montserrat National Trust, Montserrat Tourist Board, Royal Society for the Protection of Birds, Durrell Wildlife Conservation Trust and Royal Botanic Gardens, Kew.

**Geoff Hilton**, Royal Society for the Protection of Birds, c/o Sociedade Portuguesa para o Estudo das Aves (SPEA), Rua da Vitória n° 53, 3° Esq., 1100-618 Lisboa, Portugal. [geoff.hilton@rspb.org.uk](mailto:geoff.hilton@rspb.org.uk)

## Project background

The bulk of Montserrat's remaining forest cover forms a more or less contiguous block of *ca.* 14 km<sup>2</sup> in the Centre Hills range, ranging from sea-level to 740 m asl. This forest supports populations of many globally threatened and/or endemic species, and is the focus of most conservation efforts on the island. Previous work, particularly the 'Emergency Conservation of the Montserrat Oriole' project, has suggested that one of the main threats to the biodiversity of the forest is invasive alien species (IAS). Prominent among these IAS are rats (both Ship Rats *Rattus rattus* and Norway Rats *R. norvegicus*), which are abundant in the Centre Hills.

Predation by Ship Rats is known to be the major cause of nesting failure in the 'critically endangered' endemic Montserrat Oriole *Icterus oberi*. Rats are also known to attack the 'critically endangered' Mountain Chicken *Leptodactylus fallax* (a giant frog) and to predate nests of the globally 'vulnerable' Forest Thrush, but the magnitude of impacts on the populations are not known. However, based on evidence from other islands, including neighbouring Antigua, rats might be having widespread pernicious effects on native biodiversity. Rat control or eradication on islands has led to increases in plant regeneration and ground flora, and increases in populations of macro-invertebrates, reptiles, amphibians and birds, although such recoveries are neither universal nor well-studied.

Based on this, some form of rat control or exclusion for the benefit of biodiversity might become a management target for the Centre Hills. However, such management is likely to be costly. It is therefore very important to determine the real impacts of rats, to find out whether any expenditure on such management would be justified. It is also important to understand the reasons why rats are so abundant, since this may help with the design of management recommendations.

There is also major concern about the potentially devastating impacts of introduced pigs *Sus scrofa*, while little is known about the scale of adverse impacts caused by feral cats *Felis catus* and feral goats *Capra hircus*, and a number of invasive plant species. The research team of the Darwin project is attempting to clarify the scale of problems caused by these species.

## Activities and Results

### An experimental study of the impact of rats on the biodiversity of the Centre Hills

The study site, in the north-west of the Centre Hills, is divided into three areas. A central 'experimental area' will be the subject of rat control effort, while two flanking (but not immediately adjacent) 'control areas' will be left untouched. The experiment will have three phases: baseline data collection, knockdown, and post-knockdown. The baseline data collection comprises a period in



which data on the abundance of various taxa are gathered in the study site, while rats are not controlled. Following this, the rats in the experimental area will be knocked down using a combination of trapping and poison-baiting. Following an initial intensive phase, involving poison-baiting, low (but not zero) rat numbers in the experimental area will be maintained using trapping. During this knock-down phase, the rats in the two control areas will be left uncontrolled. Data on biodiversity will continue to be gathered through this period. Finally, the rat control will cease in the experimental area, and we will continue to monitor biodiversity as rat numbers return to normal levels.

The baseline data collection will last for five months. The knockdown and post-knockdown phases will last for approximately two years.

Data on the abundance of plant seedlings, reptiles and amphibians (including Mountain Chickens), macro-invertebrates will be gathered, plus information about bird nesting success, so that the diverse potential effects of rats can be evaluated.

Although the practical challenges are formidable, we hope that the experimental approach taken here will provide a robust test of whether rats affect the biodiversity of the Centre Hills. We will effectively be testing for a divergence in biodiversity trends between the control and experimental areas after the knockdown takes place, followed by a convergence once the rat control ceases.

### **An assessment of rat ecology in the Centre Hills**

Rat trapping lines have been established in widespread parts of the Centre Hills. This gives information on abundance of the two rat species, and how it varies across the hills and over time. We are also dissecting these rats, to look at diet, and breeding seasonality.

Initial analyses, conducted for the 'Montserrat Biodiversity Assessment' co-ordinated by Durrell Wildlife Conservation Trust, indicates that Norway Rats are most abundant in the lower altitude areas and around forest-edges, whereas Ship Rats are abundant throughout. Interestingly, both species tend to be most abundant in areas where there are small agricultural clearings and large (mostly non-native) fruit trees. This possibly provides a hint about why rats are so abundant in the Centre Hills.

# Poster: Ascension Island Seabird Restoration Project

**Tara Pelembe, Raymond Benjamin and Anselmo Pelembe, Ascension Island Government Conservation Office**



Pelembe, T., Benjamin, R. & Pelembe, A. 2007. Ascension Island Seabird Restoration Project. pp 231-233 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The introduction of cats on Ascension Island by human settlers since the 1800s has resulted in greatly reduced populations of breeding seabirds, and the extinction of a rail and a heron. Despite this, Ascension is still the most important breeding station for seabirds in the tropical Atlantic. The Ascension Island Seabird Restoration project, starting in 2001, aimed to remove the feral cats to enable recolonisation of the main island. This paper describes the success of this project, and gives information on the lessons learnt.

**Tara Pelembe**, Conservation Officer, **Raymond Benjamin & Anselmo Pelembe**, Field Officers, Ascension Island Government Conservation Office, Ascension Island, South Atlantic ASCN 1ZZ Telephone +247 6359 Facsimile: +247 6359 E-Mail: [conservation@atlantis.co.ac](mailto:conservation@atlantis.co.ac) [www.ascensionconservation.org.ac](http://www.ascensionconservation.org.ac)

## The Problem

Islands around the world have suffered dramatically as a result of mammalian introductions, often resulting in insular avian extinctions. The south Atlantic island of Ascension is no exception. Ascension Island lies 7°57S, 14°22W. It is a small volcanic island with an area of 97 square kilometres. Evidence from historic records, subfossil evidence and distribution of guano deposits indicates that once large colonies of seabirds nested on the main island of Ascension (Ashmole 1963a, Olson 1977, Blair 1989). Humans settled in the 1800s and their subsequent introduction of cats led to the extinction of 2 avian species, a heron and a rail. Similarly, there were large seabird population declines (Ashmole *et al.* 1994). Even though populations are greatly reduced, Ascension is still the most important breeding station for seabirds in the tropical Atlantic. Stonehouse (1962) estimated these remaining seabird population sizes as follows:

Estimated breeding populations of Seabirds on Ascension in 1962:

Red-footed Booby <i>Sula sula</i>	30
Brown Booby <i>Sula leucogaster</i>	2000
Masked Booby <i>Sula dactylatra</i>	9000
Ascension I Frigatebird <i>Fregata aquila</i>	6000
Red-billed tropicbird <i>Phaethon aethereus</i>	500
Yellow-billed tropicbird <i>Phaethon lepturus</i>	2000
Sooty Tern <i>Sterna fuscata</i>	750000
Fairy tern <i>Gygis alba</i>	2000

Black Noddy <i>Anous tenuirostris</i>	75000
Brown Noddy <i>Anous stolidus</i>	1000
Madeiran Storm Petrel <i>Oceanodroma castro</i>	3000

Ten of these eleven native seabird species (excluding the Sooty Terns *Sterna fuscata*) were limited to a few small colonies on 14 small offshore islands, inaccessible cliffs and the 5 ha Boatswainbird Island (BBI), the latter being the sole global breeding site for the endemic Ascension Frigatebird *Fregata aquila*. Sooty Terns *Sterna fuscata* continued to nest on the main land although their numbers were greatly reduced by the presence of feral cats. Their continued presence is assumed to be a result of their non-annual 9.6 month breeding cycle which includes 4-5 months away from the island. This species has been studied separately by the Army Ornithological Society and will not be reported in this paper.

## What was done about the problem

In an attempt to increase breeding seabird numbers, the Ascension Island Seabird Restoration Project was initiated in 2001. It aimed to remove the primary seabird predators: feral cats from the main island of Ascension, thus providing an unlimited number of nesting sites for all seabird species. It was anticipated that this would result in recolonisation of the main island by seabirds. Recolonisation by the IUCN redlisted endemic Ascension frigatebird was a primary goal.



*Masked Booby adult*

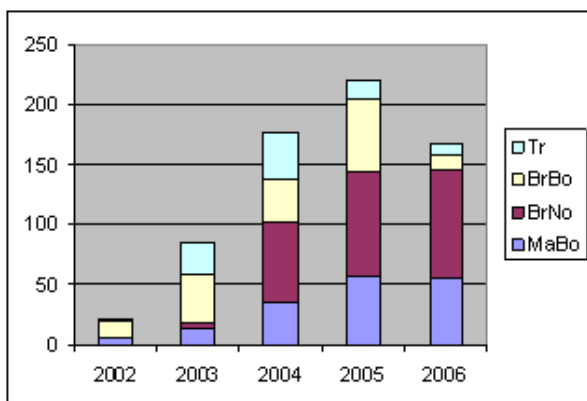


*Masked Booby chick*

The Ascension Seabird Restoration project marks an important landmark in conservation history. It is the first time that feral cat eradication has been attempted on a large island with a significant human population, while retaining domestic cats. There was significant interest expressed in the project from other Overseas Territories and internationally.

The feral cat removal proved successful and cat numbers declined rapidly. Most feral cats were gone by 2003 and the last confirmed feral cat was recorded in February 2004. (Bell et al. in prep). Since February 2004 the island has been continuously monitored and no feral cats have been detected.

Seabird recolonisation of the main island occurred almost immediately in 2002. Five species of seabirds have recolonised the main island of Ascension during and post cat-eradication: Masked Boobies, Brown Boobies, Brown Noddies, Red-billed and White-billed Tropicbirds. The two tropicbird species have been combined for the purposes of analysis as there have only been 3 breeding attempts by the Red-billed tropicbird: 1 in 2004 and 2 in 2005. Figures for 2006 are incomplete as data collection stopped at the end of May.



*Population trends of recolonising seabirds on Mainland Ascension Island*

Masked Boobies, Brown Boobies and tropic birds started to return in 2002, the year that cat eradication was initiated. The Brown Noddy return was a year later. Each species displays a different increase trend: the number of Masked Boobies returning to nest on the mainland has increased annually by approximately 20 birds; the number of Brown Noddies by differing intervals 4, 59, 20; the number of Brown Boobies and Tropic birds has not shown an annual increase after with the former decreasing in 2004 and the latter in 2005. There is an overall annual increase in the number of seabirds returning to the mainland, however it is not a total standard annual increase (2003= 63, 2004= 92, 2005 = 44).

It should be noted that the highest total annual increase is in 2004, the first year after the majority of feral cats has been eradicated

### Lessons learnt

The success of the seabird restoration project was the result of team work on a large scale, there were a large number of stakeholders, various organisations directly involved and the people of Ascension whose lives were affected by the project.

Although the project took longer than expected, the time taken for the feral cat eradication on Ascension was comparatively low to similar islands. Many lessons were learnt including:

1. The importance of enlisting high-level political support. We would never have secured the funding for the project without the support of the Administrator on Ascension.
2. We underestimated the length of time needed to remove all the feral cats and consequently the resources required for the exercise. The initial



funding catered only for the eradication stage and not the long term monitoring for either presence/absence of cats nor for the return of seabirds, so further, limited funding had to be sought.

3. Ascension has extremely rugged, undulating terrain, which is very different from situations we or others whose advice we sought, are used to. This posed challenges to the eradication methods employed.

4. Radio tracking should have been carried out before the start of the project to gain a better understanding of the distance domestic cats on Ascension will travel and to determine the extent of the buffer zone. For example, had the buffer zone been 2km rather than 1km (the distance advised by RSPCA/CPL) domestic cat deaths would have been avoided.

5. Although it would have taken more time initially, local people should have been involved in the feral cat eradication team from the beginning of the project to build support and capacity on the island. This would have resulted in a trained cadre of persons remaining on Ascension when the New Zealand team left to take forward the feral cat monitoring and respond to contingencies. Instead, the New Zealand team contract had to be extended at the project's end to train persons on the island.

6. Consulting CPL and the RSPCA on methods used for cat eradication to ensure feral cats were removed in as humane manner as possible was essential. While neither organisation could fully support the project, they were very helpful in offering advice. On the only occasion this project was reported in the UK press, they were supportive. On Ascension, the Ascension Island Society for the Prevention of Cruelty to Animals, acted as the focus for all animal welfare issues. Without their support the project would have had immense problems and perhaps failed.

## Poster: Spatial and temporal patterns of seabird recolonisation of mainland Ascension following cat eradication

**Tara Pelembe**, Ascension Island Government Conservation Office, **Norman Ratcliffe**, RSPB, **Mike Bell**, Wildlife Management International Ltd, **Richard White**, Ascension Island Government Conservation Office, and **Sarah Sanders**, RSPB

Pelembe, T., Ratcliffe, N., Bell, M., White, R. & Sanders, S. 2007. Spatial and temporal patterns of seabird recolonisation of mainland Ascension following cat eradication. p 234 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Ascension Island was formerly home to large seabird colonies, but the introduction of cats in the 1800s led to rapid population declines. Relict populations survived on inaccessible cliff ledges and offshore stacks, the largest of which is Boatswainbird island. In 2001 a feral cat eradication programme was initiated and the last known feral cat was removed from the mainland in March 2004. Seabird recolonisation of the mainland was first recorded in May 2002 and numbers have increased steadily since. Most species have occupied main island sites immediately adjacent to existing colonies, although Masked Boobies exhibit a higher degree of dispersal. The species that have recolonised are those that previous work suggested were most stressed for breeding space: Masked Booby *Sula dactylatra*, Brown Booby *S. leucogaster*, Brown Noddy *Anous stolidus* and White-tailed Tropicbird *Phaethon lepturus*, but to date there is no evidence of the endemic Ascension Frigatebird *Fregata aquila* recolonisation. Overall breeding success was relatively low compared to estimates elsewhere in each species range, and possible reasons for this will be discussed. We developed population models to assess demographic mechanisms of recolonisation. These indicate that a putative floating population that might have colonised the mainland rapidly did not in fact exist, probably owing to cat predation of recruiting birds attempting to recolonise the mainland prior to eradication.

**Tara Pelembe & Richard White**, Ascension Island Government Conservation Department, Georgetown, Ascension Island, ASCN IZZ, South Atlantic. email: [tara.pelembe@ascension.gov.ac](mailto:tara.pelembe@ascension.gov.ac); **Norman Ratcliffe**, RSPB Scotland, 10 Albyn Terrace, Aberdeen, AB10 1YP, UK; **Mike Bell**, Wildlife Management International Ltd, PO Box 14 492, Wellington, New Zealand; **Sarah Sanders**, RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK.

# Poster: Invasive species and their impact on the Wirebird

Cathy Hopkins and Gavin Ellick, St Helena National Trust



Hopkins, M.C. & Ellick, G. 2007. Invasive species and their impact on the Wirebird. pp 235-236 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The St Helena Wirebird, critically endangered and endemic to St Helena, has seen a population decline of 43% in the last 5 years to about 220 adults. Research findings so far indicate that habitat degradation, scrub invasion and feral cats are key factors in the decline. Trial habitat restoration and controlled grazing are being undertaken to increase the area suitable for the birds.



**Cathy Hopkins**, Director, SHNT and **Gavin Ellick** Conservation Officer, St Helena National Trust, Broadway House, Main Street, Jamestown STHL 1ZZ, St Helena. [sth.natrtrust@helanta.sh](mailto:sth.natrtrust@helanta.sh)

The St Helena Plover (Wirebird) is a Critically Endangered species, endemic to St Helena and with a population of about 220 adults. It is found in semi-desert, dry pasture and wet pasture areas. On Prosperous Bay Plain (semi-desert) these birds are found around and above the Central Basin area. It also favours other habitats such as Deadwood Plain, Bottom Woods, Woody Ridge and Man & Horse – dry pastures; and Broad Bottom – a wet pasture. In the last 5 years we have seen a significant decline of 43% in the population. The main causes appear to be habitat degradation due to reduced grazing, the proliferation of introduced predators and invasive plants. Of the latter, Wild Coffee *Chrysanthemoides monilifera*, Lantana *Lantana camara*, Gorse *Ulex europaeus*, Creeper *Carpobrotus edulis* and Bull Grass *Juncus capillaceus*, are most evident on Deadwood and Bottom Woods areas.

Under the auspices of an OTEP/ RSPB funded project, the SHNT is undertaking research into the breeding distribution and success of the Wirebird in these differing habitats and the causes of the decline, with the aim of increasing its population to a higher and stable level. The co-operation of the local cattle syndicate on Deadwood Pasture and the Agriculture & Natural Resources Department as well as private sector cattle and sheep owners is much appreciated by the SHNT.

From research carried out since the project's start in April 2006, we have found that feral cats are likely to be the most important predator and a key factor in the decline of this species as they use the scrub cover to approach and take chicks. Removing the scrub should enable the Wirebirds to nest more safely.

The picture below shows a wirebird getting up from eggs – the nest is a scrape in dried creeper and the bird would cover the eggs when leaving them







*Invasive bull grass, disliked by the wirebird; gorse invading pasture; and kikuyu grass overgrazed and interspersed with bare ground, preferred by the wirebird*

However, the invasive plants give the greatest cause for concern across the island, particularly in the semi-desert and dry pasture habitats. All those mentioned above currently give rise for concern. Of them, the greatest proportionate gain could probably be achieved on the Bottom Woods area if better land management was put in place. This area held 44 birds in 1989 but in 2005 there were only 5 birds recorded - a huge drop in numbers. It is likely that this decrease in population occurred because of the invasive scrub gradually taking over the area. Prickly Pear *Opuntia* sp., *Carpobrotus*, *Lantana* and *Aloe* bushes are widespread. Since April, we have found 16 birds where there is less scrub and survey work found 5 nests with 4 chicks (unfortunately apparently taken by feral cats).

On Deadwood Pasture there is evidence of widespread Bull Grass in some areas with other areas invaded by *Lantana*, *Coffee* and *Everlasting Helichrysum bracteatum*. Gorse is also prevalent. The winter rains (July-August) has seen all of these invasive species growing vigorously.

Of the other pastures where survey work is being carried out, Woody Ridge has a small amount of Wild Mango *Schinus terebinthifolia*, Gorse and many other weed species. However, the management of this pasture in terms of cattle rotation keeping the sward short is good. On Man & Horse pasture we have a lot of Bull Grass and *Lantana* with a small amount of Gorse.

The importance of reducing the spread of the invasive weeds cannot be over-emphasised in respect of the benefits to the Wirebird - research shows that it is a “fussy” bird when it comes to choosing nesting sites. It will not nest where its circle of vision is limited and, given the height of the invasives, this means that where they are found, the Wirebird is generally absent or in reduced densities. Even grass left to grow above a few inches reduces the potential nesting area for the Wirebird as well as severely reducing their feeding efficiency.

As part of the SHNT/OTEP/RSPB project, a trial restoration project is being undertaken on Deadwood Pasture. This includes the removal of invasive weeds from certain pastures combined with controlled grazing on these. On another paddock, just controlled grazing is taking place. We wish to see how different management techniques affect the Wirebird breeding success. We believe that this part of the project will increase the area of suitable nesting sites whilst improving the pasture for the cattle. We would wish to build upon this trial and welcome the opportunity to access funding for further work under the EU Invasives Species project.

# Poster: Invasive species control (*Roseapple Syzygium jambos*) and restoration of the threatened native flora of Pitcairn Island, South Central Pacific Ocean

Noeleen Smyth, Steve Waldren, Trinity College, Dublin, Naomi Kingston, National Parks and Wildlife Service, Jay & Carol Warren, Pitcairn Island



Smyth, N., Waldren, S., Kingston, N., Warren, J. & Warren, C. 2007. Invasive species control (*Roseapple Syzygium jambos*) and restoration of the threatened native flora of Pitcairn Island, South Central Pacific Ocean. p 237 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The introduced Roseapple *Syzygium jambos* has grown and spread considerably, and regeneration of native species is inhibited under its dense canopy. A native plant nursery provided plants to re-introduce in trial plots where Roseapple plants had been removed by chemical treatment. Using these results, a detailed management plan for the control of Roseapple is currently being developed.

**Noeleen Smyth & Steve Waldren**, Dept. of Botany, Trinity College, Dublin 2, Ireland Tel +353 1 4972070 Fax +353 1 6081147 email: [nsmyth@tcd.ie](mailto:nsmyth@tcd.ie) and [swaldren@tcd.ie](mailto:swaldren@tcd.ie) internet: [www.tcd.ie/Botany/garden.html](http://www.tcd.ie/Botany/garden.html); **Naomi Kingston**, National Parks and Wildlife Service, Department of Environment and Local Government, 7 Ely Place, Dublin 2, Ireland; **Jay & Carol Warren**, Pitcairn Island, South Central Pacific Ocean.

## Background

Roseapple *Syzygium jambos* was originally introduced to Pitcairn Island as a source of fuel-wood in the 19th century. The decline in the local population coupled with modernisation and use of gas cookers has meant that Roseapple has grown and spread considerably and now dominates much of the vegetation on the north side of the island beneath the main ridge. Regeneration of native species is inhibited under the dense canopy of Roseapple.

## Experimental treatments

80 trial plots (10x10m<sup>2</sup>) were selected randomly in areas dominated by Roseapple. Baseline information on Roseapple (seedling, sapling and adult density) was recorded. Soil fertility, canopy cover and details of any remaining native vegetation also were recorded. Investigation into the proportion of Roseapple present in the soil seed bank was carried out. A nursery was established to propagate native and rare species to replace Roseapple in trial plots and increase the small numbers of severely threatened endemic plant species.

## Results to date

Data on planted native species survival and growth

rate, and Roseapple mortality were recorded from experimental plots in 2005 & 2006. The overall native plant survival rate in plots was high (63.37%). One thousand nine hundred and twenty-seven sapling and adult plants of Roseapple were treated chemically and only five of these showed signs of active re-growth in 2005 (99.75% mortality). Secondary invasion by other invasive and weedy plant species was found to be problematic in plots where Roseapple was cut and the stumps chemically treated (80.80% weed cover).

## Future work

A detailed management plan for the control of the species is currently being developed and the plan will provide an exit strategy for the initial investigative phase and provide the framework to secure more funding for more extensive control of Roseapple on Pitcairn Island.

## Publications

Waldren, S., Kingston, N., Smyth, N., Warren, J. & Warren, C. 2005. Integrated plant conservation on Pitcairn Island, South Central Pacific Ocean. *Journal of Botanic Gardens Conservation International*. Special Biodiversity Issue 2 (1): 22-24.

Waldren, S., Kingston, N., Smyth, N., Warren, J. & Warren, C. 2004. Plant conservation activities on Pitcairn Island. *Flora English Nature*. Summer 2004: 14-15.

# Poster: Invasive Alien Species in Bermuda – The Current Situation

Anne F. Glasspool, W. Sterrer, Bermuda Zoological Society, and J.A. Ward,  
Department of Conservation Services, Bermuda



Glasspool, A.F., Sterrer, W. & Ward, J.A. 2007. Invasive Alien Species in Bermuda – The Current Situation. pp 238-242 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Whilst Bermuda's marine environment has largely been unaffected by invasive alien species, Bermuda's terrestrial biota have been drastically altered. At least 1200 exotic species (mainly flowering plants, insects, spiders, snails, birds, reptiles and amphibians) have become naturalised. This means that, of more than 1600 resident terrestrial plant and animal species, only 27% are native. Verrill (1902) estimated that "perhaps 90% of all the insects have been introduced by man, since settlement". Amongst the plants, at least 22 considered invasive are now a dominant feature of the 33% of Bermuda's land area that remains undeveloped. And 23 of the "100 World's Worst Invasive Alien Species" ([www.issg.org/database](http://www.issg.org/database)) occur in Bermuda. This poster details the current situation, considers pathways of entry including accidental and deliberate introductions, and outlines the regulatory framework including; prevention of introductions, control and eradication and education and public awareness.

**Anne F. Glasspool & W. Sterrer**, Bermuda Zoological Society, P.O. Box FL 487, Flatts, Bermuda, FL BX. email: [afglasspool@gov.bm](mailto:afglasspool@gov.bm); **J.A. Ward**, Department of Conservation Services, P.O. Box FL 145, Flatts, Bermuda, FL BX. email: [jaward@gov.bm](mailto:jaward@gov.bm)

## Introduction

The dramatic increase in global trade and travel over the last few decades has led to rapid acceleration of alien species movements. Bermuda now imports nearly everything it needs (including tourists and foreign workers). In 1999 an estimated 300,000 metric tonnes of goods were imported, of which the majority arrived by container ship. In the same year, there were 6,024 aircraft landings with 481,274 passengers, and 1,550 cruise ship and yacht arrivals carrying 195,586 visitors.

Whilst the Island's marine environment has largely been unaffected by invasive alien species (the most notable exception being the Pacific Lionfish), Sterrer *et al.* (2004) report that Bermuda's terrestrial biota have been drastically altered. At least 1200 exotic species (mainly flowering plants, insects, spiders, snails, birds, reptiles and amphibians) have become naturalised, which means that of more than 1600 resident terrestrial plant and animal species only 27% are native. Verrill (1902) estimated that "perhaps 90% of all the insects have been intro-



duced by man, since settlement". Amongst the plants, at least 22 considered invasive are now a dominant feature of the 33% of Bermuda's land area that remains undeveloped. And of "100 of the World's Worst Invasive Alien Species" ([www.issg.org/database](http://www.issg.org/database)), 23 species occur in Bermuda.

## Pathways of Entry - A Brief History of Alien Invasions in Bermuda

Since the time of the first human visitors, Bermuda's shores have been assaulted by an almost con-



***Changes in species composition since human colonisation for the better-known taxa of terrestrial and freshwater plants.*** (From Sterrer et al, 2004).

Insects: The total for introduced species excludes interceptions and isolated records

Flowering Plants: The total for introduced species only includes naturalised, self-propagating species

<b>Terrestrial Species</b>	<b>Endemic</b>	<b>(of which extinct)</b>	<b>Non-endemic Native</b>	<b>Introduced/ Naturalised</b>	<b>Total spp.</b>	<b>% Aliens</b>
Flowering plants	10	0	150	371	531	70
Other plants (ferns, mosses)	6	0	15	17	38	45
Mollusks	18	6	6	33	57	58
Insects	44	16	172	703	919	76
Spiders	2	0	5	34	41	83
Amphibians	0	0	0	3	3	100
Reptiles	1	0	0	4	5	80
Birds	4	3	7	9	20	45
Mammals	0	0	0	4	4	100
<b>Total</b>	<b>85</b>	<b>25</b>	<b>355</b>	<b>1178</b>	<b>1618</b>	<b>73</b>

tinual procession of invaders as detailed by Sterrer *et al.* (2004). This history has shown that there are three main pathways by which an invasive alien species can enter Bermuda and establish itself:

### 1. Accidental introductions

Perhaps the most notorious, and ecologically catastrophic local example of an accidental introduction was that of the Oyster-shell scale *Insulaspis pallida* and the Juniper scale, which arrived on shipments of conifers and which proved near-fatal to Bermuda's endemic Cedar *Juniperus bermudiana* in the 1940s. By the 1950s, an estimated 90% of the Island's Cedars had succumbed, requiring a massive effort of removing dead trees, and replacing them with imports. The Australian Whistling Pine *Casuarina equisetifolia* became the stand-in of choice, and today it dominates much of Ber-



muda's landscape. Many other alien species were mass-planted in the 1950s, from coconuts to hibiscus, Indian Laurel, Natal Plum and Norfolk Island Pine, setting the stage for a new wave of invasive aliens of which the Brazil Pepper was to become the most notorious.

### 2. Deliberate introductions

**As a Food Resource** - It was a passing visit by a Spanish vessel in the mid 1500s that saw the first deliberate introduction of an invasive alien species into Bermuda, in this case, the hog, left ashore as a future food resource for later visits, which wreaked havoc on the native flora and fauna.

**For Ornamental Purposes** - By the time of Verrill's (1902, 1907) and Britton's (1918) pioneering surveys of Bermuda's biotas, the replacement of native flora and fauna with exotics was quite advanced. The once dominant endemic Cedar *Juniperus bermudiana* had been decimated, first by burning (in the early 1600s, to rid the Island of rats), then increasingly for its value in export and shipbuilding, which by the late 1800s left large tracts of the Island clear-cut, with opportunities for deliberate replacement or invasion by exotic plants.

**As a Biological Control** - The best local examples of biological control were the efforts to stem the cedar blight. Between 1946 and 1951, several million natural insect predators belonging to more than 100 species (mostly coccinellid beetles and parasitoid wasps) were introduced from all over the world. An entomological survey in the 1980s recorded 9 coccinellid species as established (Gordon & Hilburn 1990). When it was realised



that coccinellid beetles were heavily preyed on by previously introduced lizards (*Anolis grahami* in particular), 200 specimens of the Kiskadee Flycatcher *Pitangus sulphuratus* were brought in from Trinidad in 1957 to control the anoles. The Kiskadee increased explosively, becoming a major threat to other birds, and being implicated in the extinction of the endemic Cicada in the late 1990s.

***Species brought in to be held in “captivity”, i.e. pets, which then escape/are released into the wild***

- Pets, if not wanted any more, have occasionally been released or escaped ‘back’ into the wild. The most notorious of these is the red eared slider terrapin *Trachemys scripta elegans* which was introduced through the pet trade and now resides in all of the Island’s ponds, posing a potential threat to native fauna.

**Reintroductions** - There have been two documented reintroductions locally; the large West Indian Topshell *Cittarium pica*, known as a common fossil, and the Yellow-crowned Night Heron *Nyctanassa violacea*, of which an endemic form had been breeding here in the 1600s. Despite some concerns about the extent to which the population of Common land crabs has declined with the re-introduction of the Yellow-crowned Night heron, neither species has been documented as being ecologically disruptive.

**3. Via vectors for spread sometime after an alien species has been introduced**

In many cases, invasive alien species become pests only after a considerable time-lag during which they persist in small numbers until an outbreak is triggered. The giant Indian Laurel tree *Ficus retusa*, extensively planted in the 1950s as a replacement of the endemic cedar, remained sterile until its pollinator, the fig wasp *Parapristina verticillata*,

arrived accidentally in the early 1980s. This stranger fig has now become an island-wide problem, its hemi-epiphytic seedlings sprouting from roof gutters, cracking stone walls and water tanks, and killing palms and cedar trees.

**The Current Picture Summarised**

Bermuda currently plays host to 23 of the IUCN’s listing of the Top 100 Worst Invasive Alien Species. Although one of these is a native (the comb jelly *Mnemiopsis leidyi*), and several others are not (yet?) locally invasive (the African tulip tree *Spathodea campanulata*; the Little Fire ant *Wasmannia auropunctata*; and domestic species such as goat, pig, and rabbit), this still leaves 17 species that are invasive here as elsewhere, including the water hyacinth *Eichhornia crassipes*, Kudzu *Pueraria lobata*, the Brazilian Pepper tree *Schinus terebinthifolius*, Giant Reed *Arundo donax*, Lantana *Lantana camara*, Leucaena *Leucaena leucocephala*, Wedelia *Wedelia trilobata*; the Argentine ant *Linepithema humile*, Big-headed ant *Pheidole megacephala*, Rosy Wolf snail *Euglandina rosea*, Sweet Potato whitefly *Bemisia tabaci*, the Western mosquitofish *Gambusia affinis*, Giant toad *Bufo marinus*, Starling *Sturnus vulgaris*, Red-eared slider *Trachemys scripta*, Domestic cat *Felis catus*, Mouse *Mus musculus* and Ship rat *Rattus rattus*.

Between 1998 and 2000 the Bermuda Biodiversity Project conducted 1,440 surveys of Bermuda’s vegetation (Anderson *et al.*, 2001, Glasspool *et al.*, in prep). In total, 394 plant species were recorded, of which 112 were native, and 282 non-native. As might be expected, anthropogenic habitats (Wayside, Hedgerow, Arable, Garden and Golf Course) are the most heavily invaded by aliens. Coastal habitats and Peat Marshes are relatively uninvaded, at least in numbers of aliens, and natives retain dominance. By contrast, Upland habitats are a





*Alien plant species considered locally invasive from the findings of the Bermuda Biodiversity Project Survey (in prep).*

Participants in the 2003 Darwin-funded Invasive Alien Species Workshop also identified the following species as cause for concern; Morning glory *Ipomoea indica*, Schefflera, Murray red gum, Madagascar olive *Norhonia emarginata*, Paragrass *Panicum barbinodes*, Kudzu *Pueraria lobata*, Solandra, Yew, Elephant Ear *Philodendron giganteum*, Black medic, Calophyllum, and Sanseveria as potential problem species.

Common Name	Species
Ardisia	<i>Ardisia acuminata</i>
Cow Cane (Giant Reed)	<i>Arundo donax</i>
Fern Asparagus	<i>Asparagus densiflorus</i>
Long Leaf Asparagus	<i>Asparagus officinalis</i>
Wedding Fern	<i>Asparagus setaceus</i>
Madagascar Buddleia	<i>Buddleia</i>
Casuarina (Horse-tail Tree)	<i>Casuarina equisetifolia</i>
Lady of the Night	<i>Cestrum nocturnum</i>
Fiddlewood	<i>Citharexylum spinosum</i>
Clerodendrum	<i>Clerodendrum spp</i>
Pothos Vine	<i>Epipremnum pinnatum cv.</i>
Surinam Cherry	<i>Eugenia uniflora</i>
Indian Laurel	<i>Ficus retusa (microcarpa)</i>
Jumbie Bean (Wild Mimosa)	<i>Leucaena leucocephala</i>
Chinese Fan Palm	<i>Livistonia chinensis</i>
Creeping Fern	<i>Phymatosorus scolopendra</i>
Water Hyacinth <sup>1</sup>	<i>Piaropus crassipes</i>
Allspice	<i>Pimenta dioica</i>
Guava	<i>Psidium guajava</i>
Water Fern <sup>2</sup>	<i>Salvinia rotundifolia</i>
Mother-in-Law's Tongue	<i>Sansevieria trifasciata</i>
Brazil Pepper	<i>Schinus terebinthifolius</i>
Wedelia	<i>Wedelia trilobata</i>

diverse mix of aliens in which native trees persist largely thanks to protection and planting in gardens and nature reserves. A group of 11 invasive canopy plants headed by the ubiquitous Casuarina and Brazil Pepper is present in 9 (60%) or more of the 15 habitats, and is at least visually prevalent even in exposed coastal habitats. Understorey plants are severely invaded by Wedelia, Fern Asparagus, Fennel, Japanese Hawksbeard, Sow Thistle and Cane Grass. Furthermore, the frequency in the understorey of recruits of Brazil Pepper, Surinam Cherry, Allspice, Chinese Fan Palm and other invasive canopy species suggests that the replacement of native forests with alien species is an ongoing process.

Although there are no quantitative data on the fauna of these habitats, it is expected that habitat homogenisation brought about by the spread of so many invasive plants has affected the composition of associated biota including bacteria, fungi, and

invertebrates.

## The Regulatory Framework

Regulatory responsibilities for dealing with invasive alien species lie with several different government departments. The activities undertaken fall into three broad categories: those with legislative responsibilities, including licensing; those providing technical support and advice; and those undertaking protection, enforcement and control. No single department has exclusive responsibility for any of these activities.

Today, there are several legislative instruments for tackling invasive aliens. The 1972 Fisheries Act prohibits the importation of any fish. The 1930 Agricultural Act covers the control of plant diseases and pests through the 1970 Regulations; this Act also covers restrictions on animal importations. The 1975 Protection of Birds Act specifically excludes four bird species from protection; these are the Common crow, Starling, Kiskadee and House sparrow. There is a gaping hole in the legislation with respect to the importation of plant species which is currently being addressed.

### 1. Prevention of Introduction

With the recent restructuring of the Ministry of Environment, the Department of Environmental Protection has responsibility for conducting a risk assessment to determine which non-native animal species are permissible. Health certificates must be presented for all imported animals, and there is a quarantine facility for placing animals in the event of any problems. The front line enforcement of these regulations lies with the Bermuda Customs who liaise with the Department of Environmental Protection. In 2000, the Government Plant Protection Laboratory inspected 813 shipments of plant material containing a total of 850,000 plants - from bedding plants and bulbs to cacti, Christmas trees, fruit trees and orchids - in addition to 10,622 fruits and vegetables, 7,231 cases of citrus and 3,440 bags of seed potatoes. In 1999 the Laboratory made 108 interceptions of which mites, thrips, whiteflies, mealybugs, aphids, spiders and snails were the most frequent. Despite this effort, it is accepted that there are improvements that could be made in current preventative measures: e.g. shipping containers which have been stored on soil lots, arrive on Bermuda's docks without sterilization; imported plants are transported from



the airport to the Botanical Gardens before being inspected; cruise ships arrive and dock with potted plants on board; and plants and some animals, such as dormant triops shrimp, may be purchased through the internet and mailed through the postal system undetected.

## **2. Control and Eradication**

Bermuda bears history to a number of eradication efforts, one of the earliest being the torching of St Georges Island in the 1600s in an effort to get rid of the plague of rats. Given that many alien species remain relatively dormant for at least some period of time before really establishing themselves, there is an opportunity for immediate action when an alien species is first identified. This has been demonstrated with such species as guinea pigs, when a prompt response to an illegal release into the wild has enabled their speedy capture. Responsibility for early detection typically falls on the Departments of Environmental Protection, Conservation Services and Parks. However members of the public also have a critical role to play. The recent reports of the Pacific Lionfish in local waters, have all been through public reporting. Whilst Island-wide eradication is a lofty goal, eradication of a pest species on 'ecological islands' has been applied in Bermuda with great success. The most obvious example is Nonsuch Island, which has been restored and now represents Bermuda's pre-settlement habitats. More typically though, complete eradication is not a realistic option, and at best, an invasive alien species can be controlled. Priority is generally given to areas of ecological significance, such as the Island's nature reserves and successful restoration efforts are underway in Paget Marsh and Walsingham.

## **3. Education and Public Awareness**

Despite the impact of the cedar blight of the mid 1950s, the visual presence of known predators such as Red eared slider terrapins and feral cats, and the persistence of nuisance pigeons and chickens, not all policy-makers or members of the public share the view that invasive species negatively impact biodiversity. NGOs have an important role to play in raising awareness, as does the

Department of Conservation Services. A number of publications have been written for the wider public audience highlighting the threat posed by invasive species, whilst local expositions such as the Annual Exhibition and the Eden Project and the biennial Environmental Youth Conference, have been used as a platform for further broadcasting this message. Pamphlets produced by the Department of Environmental Protection also highlight the dangers of illegally importing plants and animals. There is a recognized need for more extensive training of front line enforcement agencies.

## **Acknowledgements**

We gratefully acknowledge the support of the UK Government's Darwin Initiative, the Bermuda Government and the Bermuda Zoological Society and Mr & Mrs Anthony Jonklaas of the Kenridge Fund for this work.

This is Contribution #130, Bermuda Biodiversity Project (BBP), Bermuda Aquarium, Natural History Museum and Zoo.



# Poster: Eradicating New Zealand flax *Phormium tenax* at Tristan da Cunha

**Peter Ryan, Sarah Sanders, James Glass & Simon Glass**

Ryan, P., Sanders, S., Glass, J. & Glass, S. 2007. Eradicating New Zealand flax *Phormium tenax* at Tristan da Cunha. p 243 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Tristan da Cunha faces numerous problems with invasive alien species, chiefly on the main island of Tristan. The two outer islands, Inaccessible and Nightingale, are both free of introduced mammals and have only a few species of introduced plants. One of the most intrusive plant invaders is the New Zealand flax *Phormium tenax*, a large, long-lived species that has the potential to transform the vegetation over large parts of the islands, which could negatively impact on seabird nesting sites. Accordingly funds were sourced from the Overseas Territories Environment Programme (OTEP) to start an eradication programme for the species at both islands.

The initial clearing programme planned for 2003 had to be postponed due to lack of space on ships to Tristan, but in September 2004 a team of four led by Peter Ryan set off from Cape Town armed with 1000 m of rope and an arsenal of clearing equipment to tackle the plants growing on the 200-300 m high sea cliffs of Inaccessible Island. Boosted by two high-altitude experts from South Africa's highly successful Working for Water alien clearing programme, they were able to remove almost all existing plants, estimated at some 500 fully grown individuals and several thousand smaller plants. Later that year Peter returned to the island on a bird census and was able to remove the last few large plants.

In the same summer, a team from Tristan led by James Glass, head of Tristan's Natural Resources Department, tackled the hundred or so plants growing on and around the Ponds on Nightingale. This was no mean feat, as some of these plants had grown to house-size dimensions and required a concerted team effort to uproot.

Nightingale Island is visited regularly by personnel from Tristan's Natural Resources Department, and they will continue to check for seedlings or re-growth of plants there. Inaccessible Island is seldom visited, and with the majority of plants growing on near-vertical cliffs, it requires dedicated follow-up. We are currently hoping to revisit the island in 2007, three years after the initial clearing, to remove any new growth.

**Peter Ryan; Sarah Sanders; James Glass & Simon Glass**, Government of Tristan da Cunha, Tristan da Cunha. [tdcenquiries@stratosnet.com](mailto:tdcenquiries@stratosnet.com)

# Poster: Alien plant invades Montserrat

S. Barrios, M. Hamilton and C. Clubbe

Barrios, S., Hamilton, M. & Clubbe, C. 2007. Alien plant invades Montserrat. p 244 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)



***Casuarina equisetifolia*** is an alien invasive plant that is threatening Montserrat's native habitats. Originally from Australia and the Pacific Islands, it is a species that spreads rapidly by wind blown seeds.



## How to recognize the invader:

- Prefers dry sandy soils, especially near the seashore
- Colonises fresh volcanic ash
- Is a tree to more than 100ft producing a dense shade
- Has fine green branches, often drooping (A)
- The fruit is a small nut that contains many winged seeds that are wind dispersed (B)

Kew  
PLANTS PEOPLE  
POSSIBILITIES



For more information contact the  
Centre Hills Project Office.  
Tel: 491 3088



# **Topic 7: Obtaining and using resources (not just money)**

**Session Organiser: Nigel Crocker (UKOTCF Treasurer)**

## **Introduction**

The Invasive Species session concluded by identifying a requirement for a needs analysis. The Resources session will continue that theme, whilst identifying the challenges presented in Overseas Territories in obtaining resources to facilitate evaluation and delivery of solutions for those priorities. There are cross-cutting environmental issues to address – for example, implementation of charters and multilateral environmental agreements (MEAs), and invasive species often requiring rapid solutions and actions.

Contributions will be received from those engaged with biodiversity conservation in the Overseas Countries & Territories (OCTs) and Outermost Regions (ORs) of some of our European partner states, notably the Netherlands and France. These highlight similar challenges which they have faced and how these have been addressed, including access to funding from their metropolitan states and territory governments and agencies, and how these have shaped the biodiversity effort.

An overview of the recently formed Bioverseas initiative for biodiversity and environment in EU ORs and OCTs will be presented, enabling us to see how collaboration within the EU can assist in providing a unified approach to biodiversity conservation, especially where territories are grouped in a geographical area and share similar issues and challenges.

There will be an opportunity to discuss how these might be implemented elsewhere and whether there are lessons to be learned which could inform initiatives on behalf of UK Overseas Territories and Crown Dependencies. In particular, we will explore what additional support might be forthcoming from UK Government for ongoing implementation actions, building on the excellent seed-finance provided by OTEP.

Funding can arise from non-governmental sources, especially where there are financial and charitable bodies willing to support local initiatives. These may be supported by local territorial environmental taxation levied on tourists, but there is a need to ensure that those funds are directed to the acquisition of habitat under threat and support for ongoing conservation management.

Some resources are less easily defined in financial terms, although these are as important if not more so, especially when enthusiastically pursued by local activists with something to offer the community in return. Support from and to the community through involvement in local conservation, both inform and educate an appreciation of the environment and engender ownership of solutions.

Support from UK Overseas Territory Conservation Forum member organisations can take many different formats. We are aware of the excellent work carried out by RSPB and RBG Kew, as well as UKOTCF itself, on the ground in UKOTs, and we should be aware of the sabbatical scheme offered by RSPB and subject matter expert support from RBG Kew, as well as current pilot work by UKOTCF on deploying volunteers.

All of these presentations and the discussions that they generate will assist in informing the options available to UKOTs and CDs, as well as other territories, as well as in identifying solutions which might be sought to address issues and priorities for the future.

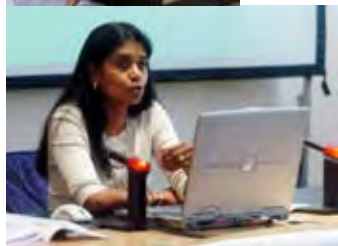
# Resources for conservation and sustainable development in ORs and OCTs : integration in European strategies for Conservation and Research?

Philippe Feldman, Cirad, and Josiane Irissin-Managata, Réunion Regional Council



Feldman, P. & Irissin-Managata, J. 2007. Resources for conservation and sustainable development in ORs and OCTs : integration in European strategies for Conservation and Research? pp 246-248 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Biodiversity in Outermost Regions (ORs) and Overseas Countries and Territories (OCTs) is exceptional but most exposed to climate change, natural hazards and pressures of human activities. Biodiversity is a fundamental asset for economy in all ORs and OCTs. Nevertheless, this reality remains poorly known and understood, despite the visible importance and richness of ecosystems. For example, the French ORs and OCTs have 26 times more endemic plant species, 60 times more endemic birds, and over 100 times more endemic fishes than continental France. But ORs and OCTs also have to answer the immediate needs of a growing population, which means building infrastructure, increasing urbanization, strengthening economic activity. This situation leads to enormous challenges in terms of biodiversity conservation and sustainable development.



Financial support to ORs and OCTs include regional, national or European funding and numerous fiscal advantages. Amounts and rules differ depending on the different statutes, but in most cases these financial tools have a major impact on development choices - and biodiversity. It is of crucial importance to take biodiversity into consideration in all development tools and projects, and that specific long term regional, national and European means can be identified for biodiversity conservation. A complete analysis of these issues in the French ORs and OCTs has been published in September 2006 by IUCN French national Committee, showing which proportion of funding is devoted to biodiversity conservation and the impacts of development policies and projects.

Networking research in ORs and OCTs is also fundamental to address the numerous questions and problems linked to biodiversity, climate change and sustainable development. Biodiversity policies in the EU are highly fragmented within and between the Member States. This situation is amplified in ORs and OCTs. Several critical barriers hinder cooperation of the overseas regions and territories between themselves, with continental Europe and with third countries, among which very long distances, isolation and time differences between these regions spread over the world, deficiency of resources and critical mass, lack of timely access to facilities, lack of awareness and difficult access to information.

A first initiative has been proposed at the European level to support the cooperation and coordination for research on biodiversity and sustainable development between all ORs and OCTs. This project called Net-Biome, intends to use the ERA-NET Scheme, which is a tool of the European Framework Programme allowing funding for Coordination Actions. This project is currently under preparation after a first positive evaluation during the Sixth Framework Programme. By substantially improving the knowledge and coherence of funding of both basic and applied research, Net-Biome aims at making an important contribution to improve RTD efforts across European ORs and OCTs and to support long-term perspectives in European research policies to address the need to prevent, avoid and remedy the serious impacts of climate change and anthropic pressures on tropical and subtropical biodiversity.

Finally, a coherent framework could be initiated on sustainable management of biodiversity, with adequate tools and means. It is important for ORs and OCTs to build it together, with the active support of the European Commission. Such framework could take the shape of a “European initiative for ORs and OCTs biodiversity”.

**Philippe Feldman**, Biodiversity Scientific Officer, Cirad, TA40/PS1, 34398 Montpellier Cedex 5, France. email : feldmann@cirad.fr;

**Josiane Irissin-Managata**, Research & Innovation Chief Officer, Réunion Regional Council, Réunion Island;

## Why?

Understanding the interactions between ecosystems and human activities, especially specific agriculture, forestry and fisheries, is essential to ensure sustainable development in these areas.

## Rationale

The seven RUP (French abbreviation for ORs) and the 21 PTOM (OCTs) are exceptional in terms of tropical and subtropical biodiversity. They are more fragile and threatened by global climatic changes and human activities than continental Europe. They are located in or near several biodiversity hotspots.

Due to the isolation and fragmentation of the ORs and OCTs, conservation and scientific activities are less developed. They have unique opportunities to develop regional and international collaborations for Europe.

Most of the proposals made at European level failed year after year due to lack of visibility and of “vision” (too much concerned by local preoccupations to be “understable” at European level ).

## Recommendations from a workshop on biodiversity and specific agriculture, Las Palmas, June 2002

It is necessary to bring together European teams with local political/scientists/environmentalists and small and middle-sized enterprises (SMEs) in one of the largest coordinated tropical and subtropical biodiversity network to date, including Macaronesian, Caribbean, Latin and South America and Indian Ocean countries.

## How can the Framework Program help ?

Different tools:

ERA-NET Net-Biome:

Experience in building an ambitious partnership between most European OCTs and ORs.

## Why should Europe be interested?

Because of its diversity, the whole European Overseas offer opportunities which are unique in Europe:

- Development of models for understanding the interactions between Man and Nature and the impact of global changes, which can be transposable
- Innovation in the means of local and global biodiversity management
- International cooperations

Need of a research programme meeting the stakes in the European Overseas

## ERA-NET

Challenge: How can a general consensus be changed into an operational action plan (from diagnostic to action)?

How can the local actors be in the heart of the initiatives and projects? How can all the stakeholders interact efficiently at the regional, national, European and international levels?

Networking research activities conducted at the regional and national level, and ensuring their mutual opening Participation of the 7 Outermost Regions and of most of the tropical OCTs (11: FR, NL, UK, except Aruba, Mayotte, Wallis & Futuna).

## Objectives

- Listing efficiently the local priorities with all stakeholders



- Stimulating the cooperation and coordination of the research programmes on integrated and sustainable management of tropical and subtropical biodiversity
- Identifying and removing the barriers to cooperation
- Promoting the widening of cooperation to the Third-Countries: development cooperation organised in sub-regions
- Implementing in the long term an ambitious European research programme

### **Beyond biodiversity research**

- Contributing to the reinforcement of the research efforts in the European Overseas
- Developing the abilities of implementing a common project for research programming
- Improving integration in the EU
- Bringing visibility and a real acknowledgement of the importance and role of Overseas stakes in the Framework Programme and more widely for Europe
- Reinforcing the scientific excellence of Europe thanks to the ORs and OCTs

### **Today's situation**

This is the first and unique example of collaboration widely associating the whole tropical and sub-tropical territories and regions of EU states Overseas.

Elaborating the proposal and the resulting eligibility demonstrated the ability to work together.

It is very important to maintain this dynamic and the quality of the confidence between all the parties involved - of which it enabled creation.

It has shown that building up an equitable network has permitted development of a project previously thought impossible, because it linked ORs with OCTs, research teams with conservationists and with politics, gathering fragmented and isolated regions and territories which applied for an ambitious competitive EC call and succeed.

# Obtaining resources for conservation: a Dutch Caribbean perspective

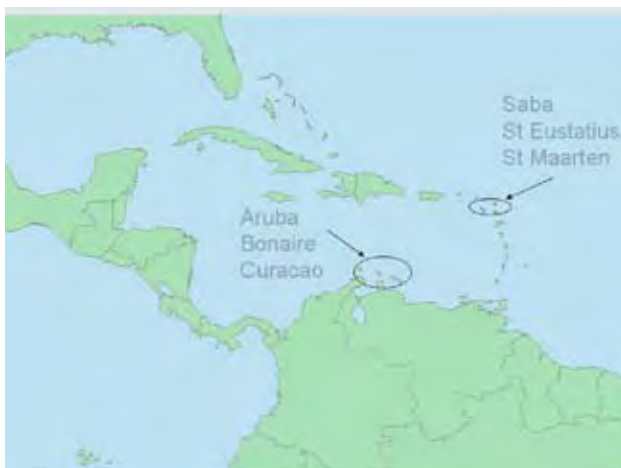
**Kalli De Meyer, Dutch Caribbean Nature Alliance**



De Meyer, K. 2007. Obtaining resources for conservation: a Dutch Caribbean perspective. pp 249-252 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Many protected areas have been created since the first on Bonaire in 1969, with designated areas on all islands subsequently containing high levels of endemism, yet all have few resources are under-staffed and under-funded. The Dutch Caribbean Nature Alliance was founded and mandated by central government to manage Important Nature Conservation Areas in the Netherlands Antillies. Whilst some central government funding is provided, DCNA has explored and been successful in obtaining further funding notably from the Dutch Postcode Lottery, whilst other European funding potential continues to be explored.

**Kalli De Meyer**, Executive Director, Dutch Caribbean Nature Alliance, Kaya Grandi #20, Bonaire. Tel: + 599.717.5010 Fax: + 599-786.0675 email: [kdm@telbonet.an](mailto:kdm@telbonet.an) [www.DCNAnature.org](http://www.DCNAnature.org)



## Netherlands Overseas Territories: locations, areas, human populations

Aruba	193 km <sup>2</sup>	90,000
Bonaire	288 km <sup>2</sup>	12,000
Curacao	472 km <sup>2</sup>	130,000
Saba	13 km <sup>2</sup>	1,500
St Eustatius	21 km <sup>2</sup>	2,200
St Maarten	40 km <sup>2</sup>	40,000

## Overseas Countries and Territories: coral reefs

	Country and geographical locations	Reef Area (km <sup>2</sup> )	% of world reefs
1	Republic of Indonesia	51,020	17.95%
2	Australia	48,960	17.22%
3	Republic of the Philippines	25,060	8.81%
4	<b>France</b> including: Clipperton, Mayotte, Réunion, Guadeloupe, Martinique, New Caledonia, French Polynesia, Wallis and Futuna Islands	<b>14,280</b>	<b>5.02%</b>
12	<b>United Kingdom</b> including: British Indian Ocean Territory, Anguilla, Bermuda, Cayman Islands, Pitcairn, Turks and Caicos Islands, British Virgin Islands	<b>5,510</b>	<b>1.94%</b>
60	<b>Netherlands</b> including: Dutch Caribbean islands	<b>470</b>	<b>0.17%</b>
	GLOBAL TOTAL	284,300	

**Netherlands Caribbean Territories: lush rain forest**



**Netherlands Caribbean Territories: desert landscapes**



**Netherlands Caribbean Territories: dunes, salinas**



**Netherlands Caribbean Territories: coral reefs**





## Netherlands Caribbean Territories: mangroves

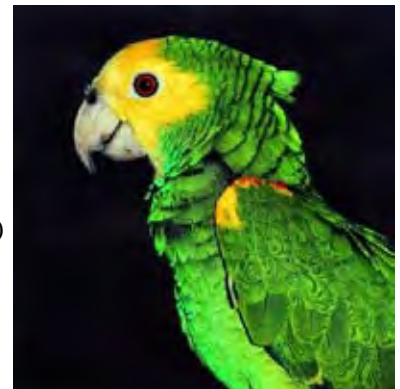


## Netherlands Caribbean Territories: Saba Bank



## Netherlands Caribbean Territories: 200 species of endemics (ABC islands)

marine snails (57sp),  
beetles (27sp),  
spiders (13sp),  
birds (21 sub-species),  
land snails (15sp)  
reptiles (11sp) .



Dutch Caribbean islands are without a doubt the biodiversity hotspot within the Kingdom.



## Protected areas

The earliest park was Washington Slagbaai Park on Bonaire, designated in 1969.

Today, every island has one or more protected areas.

Each Park is run by a local non-governmental, non-profit foundation.

Each Park has opted for a co-operative management arrangement with stakeholders.

There are five Wetlands of International Importance under the Ramsar Convention on Bonaire and one of Aruba (see map on next page).

UNEP/ICRAN: Bonaire National Marine Park is recognised as a Demonstration Site, and Saba National Marine Park recognised as a Target Site.

Yet ...the parks have few resources, are understaffed and underfunded. On St Eustatius, the parks had to close their doors in October 2003



activities in the Dutch Caribbean.

## Trust Fund

Nature Forum (1998, 2000, 2002) mandated Central Government to execute a study of a Trust Fund for the Management of Important Nature Conservation Areas in the Netherlands Antilles.

The Trust Fund study started in 2003, and the Trust Fund Report published in 2005: [www.DCNAnture.org/donations/trustfund.html](http://www.DCNAnture.org/donations/trustfund.html)

It concluded that € 18.9 million (in an endowment fund) is needed (revenue of 6%) to cover the basic management costs per island.

IUCN NL lobbying activities resulted in a motion being brought before the Dutch Parliament in 1998 requesting substantial financial support for the Trust Fund.

when there was simply no money left.

Challenge: the Netherlands Antilles and Aruba are not eligible for development aid because we are part of the Kingdom of the Netherlands. However, we are not eligible either for most conservation funds in the Netherlands. We are also remote and small.

## Dutch Caribbean Nature Alliance

DCNA is committed to working together to safeguard biodiversity.

The Mission is to safeguard the biodiversity and promote the sustainable management of the natural resources of the islands of the Dutch Caribbean by supporting and assisting the protected area management organisations and nature conservation

In 2005 the Dutch Ministry of the Interior sent a 'Letter of Intent' and € 1 million, with a ten-year agreement for € 1 million / year.

Dutch Postcode Lottery supplied in 2005 project funding of € 500,000, and in 2006 special project funding of € 1.9 million. Further developments are in negotiation, including requesting beneficiary status.

The European funding potential is being explored in conjunction with our partners, including UKOTCF, in Bioverseas. This is explored further in the following presentation. However, it is worth recalling here also the challenge to the European Union from the Paris conference *Integrating Biodiversity into European Development Co-operation*:

Challenge 4 – Recognition of biodiversity in Overseas Countries and Territories:

The EU should develop a coherent framework for environment in OCTs to promote sustainable management of their important biodiversity areas, and also encourage joint efforts with Outermost Regions including adequate funding mechanisms.





# Bioverseas: Initiative for biodiversity and environment in EU ORs and OCTs

Jean-Philippe Palasi, IUCN, Europe Regional Office



Palasi, J.-P. 2007. Bioverseas: Initiative for biodiversity and environment in EU ORs and OCTs. pp 253-257 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

With a secretariat in Brussels, Bioverseas seeks to provide a co-ordinated approach to European Union institutions for the several umbrella conservation bodies including UKOTCF and equivalents that come together via it. The Overseas Territories and Countries (OCTs) and Overseas Regions (ORs) occur in major biodiversity hotspots, including in the Caribbean, Indian Ocean and South Pacific, as well as hugely important islands in temperate and arctic regions. Recent conferences in Nuuk, Greenland and Paris, linking with the Overseas Countries and Territories Association, provided a useful platform for OCTA to launch their report *From the Tropics and the Polar OCTs* to the EU and to build on this and Bioverseas initiatives. The challenge for the EU is to develop a coherent framework for environment in OCTs to promote sustainable management of their biodiversity, supported with adequate funding.

**Jean-Philippe Palasi**, Programme Coordinator, European Overseas Regions & Territories, Development cooperation, IUCN Regional Office for Europe, Boulevard Louis Schmidt 64, Brussels 1040, Belgium. [jean-philippe.palasi@iucn.org](mailto:jean-philippe.palasi@iucn.org)

There are 20 Overseas Countries and Territories (OCTs), of France, the United Kingdom, the Neth-

erlands and Denmark, which have a relationship with the European Union.





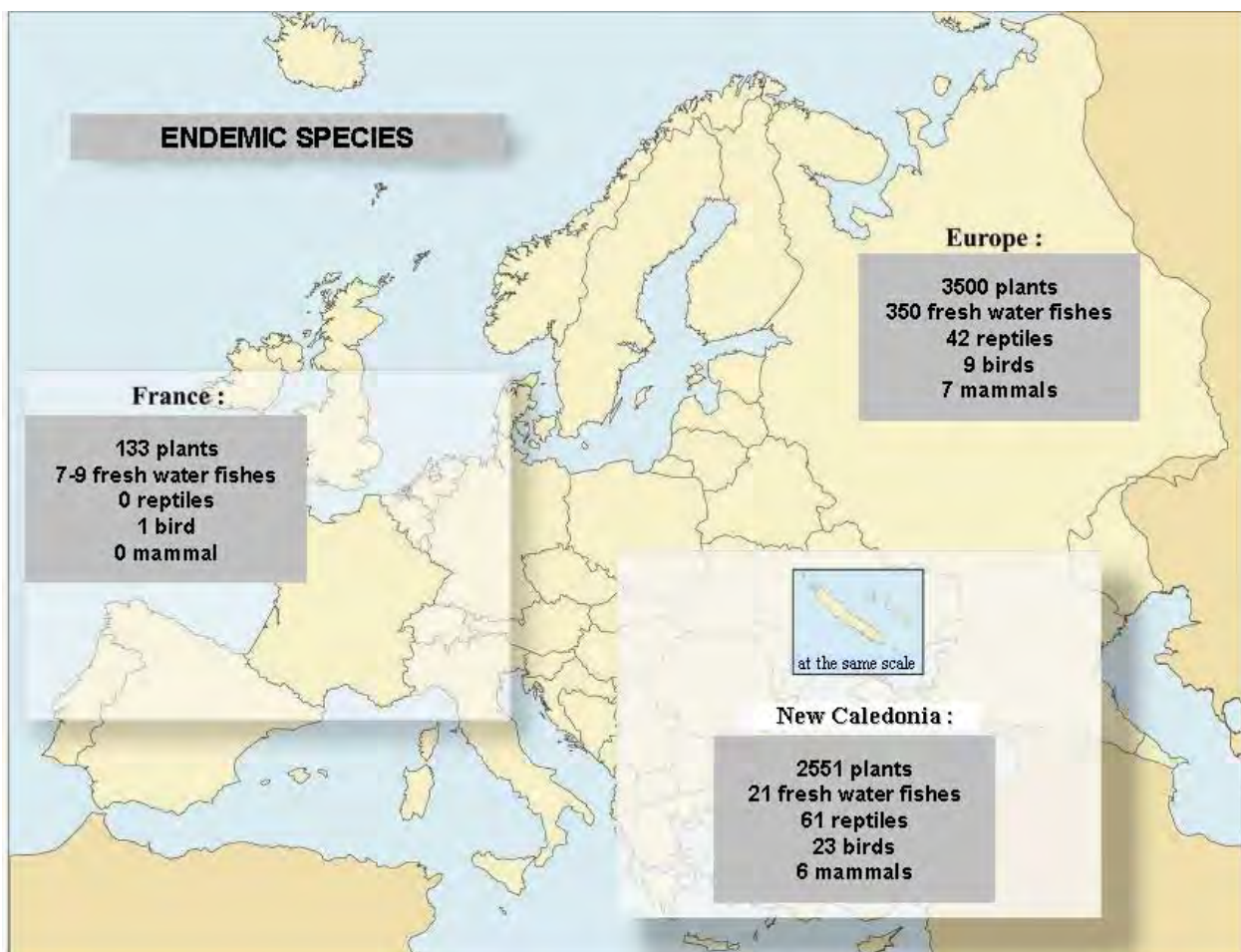


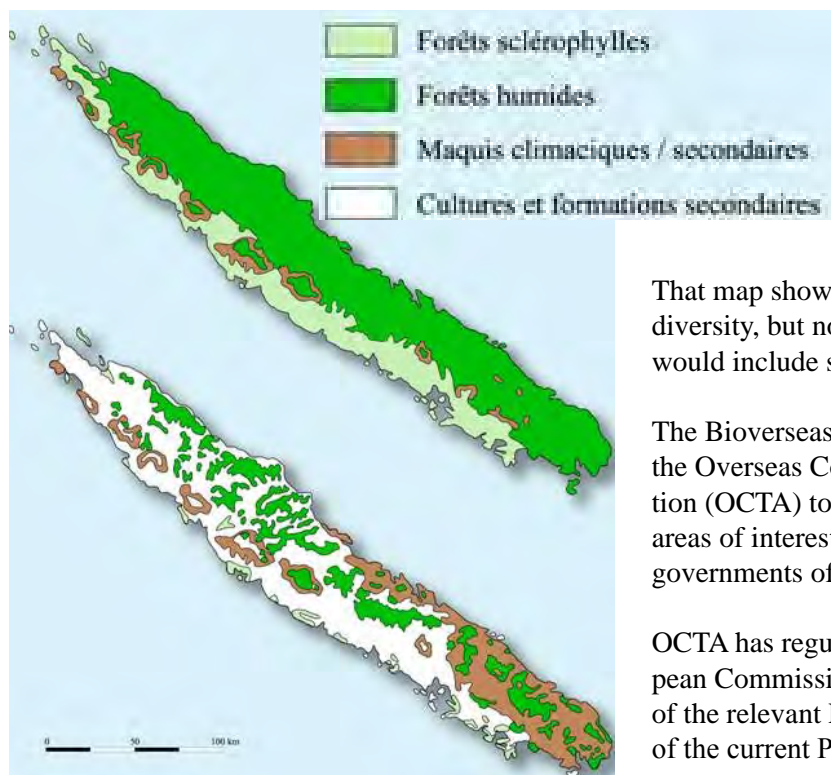
Seven Outermost Regions (ORs), French Guiana, Réunion, Martinique, Guadeloupe, Madeira, Azores and the Canary Islands, form part of the European Union.

These include superb natural areas, as we saw in the previous presentation. I show some photographs here from New Caledonia.

New Caledonia supports the same order of endemic species as the whole of Europe, despite being much smaller. It is shown at the same scale on the map below.

In common with many other islands, it has suffered large losses in natural ecosystems since human settlement, including almost total loss of dry forest



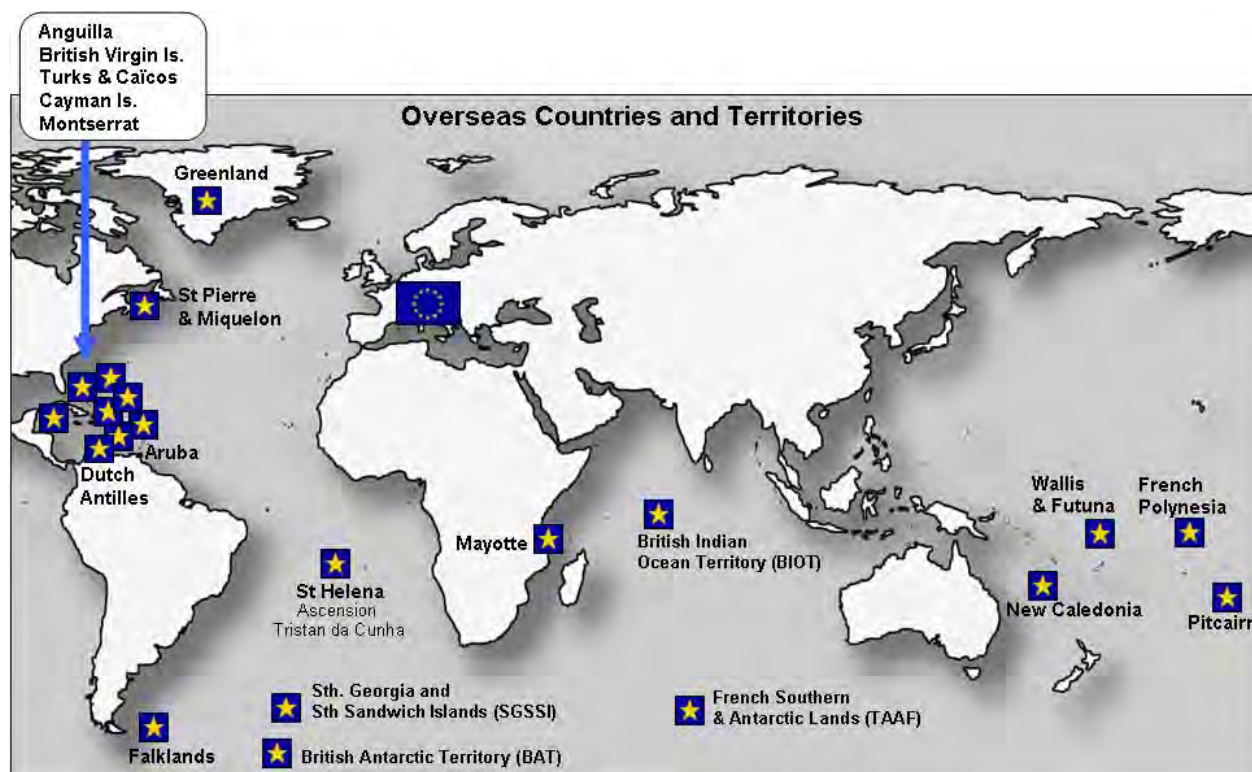


*Evolution of natural ecosystems on New Caledonia since human beings arrived*

That map shows also some of the centres of biodiversity, but not the endemic bird areas, which would include some of the temperate islands.

The Bioverseas Initiative has been liaising with the Overseas Countries and Territories Association (OCTA) to explore and take forward common areas of interest. OCTA is an association of the governments of the territories.

OCTA has regular joint meetings with the European Commission, attended also by representatives of the relevant European Union Member States and of the current Presidency State.



and huge reductions in wet forest.

The Overseas Countries and Territories of France, the Netherlands and the United Kingdom are spread around the world, as shown in the map above.

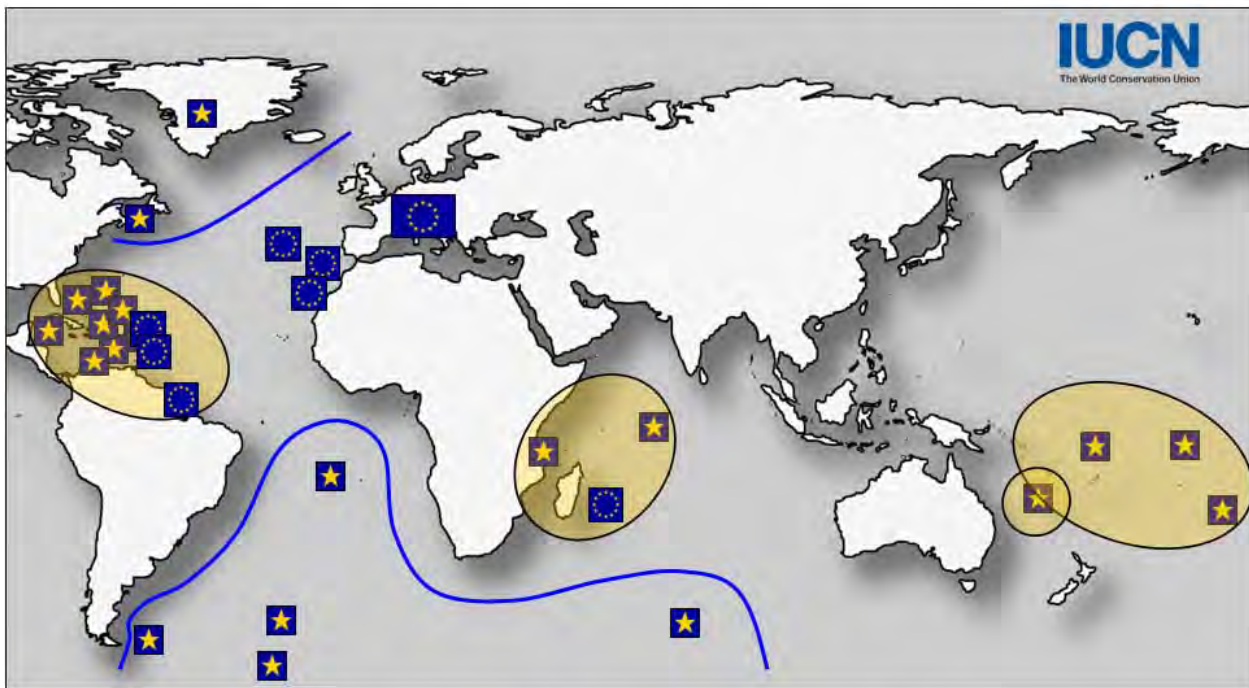
The map on the next page adds the Outermost Regions of the European Union, the overseas parts of metropolitan France, Portugal and Spain.

At the instigation of the governments of Greenland and French Polynesia, representatives of Bioverseas were invited to the regular OCTA/European Commission meeting at Nuuk, the capital of Greenland in September 2006. Mike Pienkowski of UKOTCF and Jean-Philippe Palasi of IUCN filled these roles.

Apart from presentations from Bioverseas, the conference received also an update from the



## A major potential for European action and regional cooperation



★ OCTs

🇪🇺 Outermost Regions (ORs)

OCTs / EC forum  
Nuuk, Greenland, 5 - 7 sept 2006



**Challenge 4** of this message is:

### ***Recognition of biodiversity in Overseas Countries and Territories***

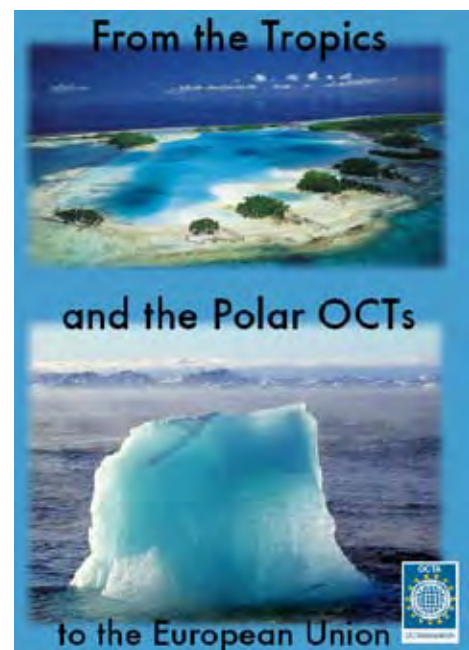
The EU should develop a coherent framework for environment in OCTs to promote sustainable management of their important biodiversity areas, and also encourage joint efforts with



consultants retained by the European Commission to develop environmental profiles on the OCTs. There was also a launch and presentation of OCTA's own report *From the Tropics and the Polar OCTs to the European Union*.

OCTA mandated its members, Greenland and French Polynesia, to take its environmental message to the conference *Biodiversity in European Development Cooperation* in Paris from 19 to 21 September 2006.

The conference developed the *Message of Paris: Integrating biodiversity into European development cooperation*.





***Biodiversity in European Development Cooperation  
Paris, 19 - 21 sept 2006***



Outermost Regions including adequate funding mechanisms.

The conference amplified this with more detailed points:

While building the spirit of the 2006 OCT-EU Forum in Nuuk (Greenland), and recognizing the global importance of their biodiversity as well as taking into consideration the special responsibility of the EU for its OCTs, and Outermost Regions (ORs):

Participants encourage the European Commission and Member States to:

- Develop a coherent framework for environment in OCTs, aiming, among others, towards a sustainable management of important biodiversity areas, and allowing joint efforts with Outermost Regions as they are the entities with the most similar stakes within the European Union;
- Ensure that adequate funding is given to environmental and biodiversity issues in the OCTs, including an outsourced small grants facility and improved access to European programmes for local bodies and NGOs in

coordination with the local authorities;

- Develop joint research programmes focusing on the biodiversity of OCTs and ORs, and also strengthening joint efforts with regional partner countries;
- Strengthen both the OCTs and the EU positions in the international debate on climate change, by making use of the worldwide and diverse network of OCTs and ORs to evaluate the interactions between ecosystems, climate change and local communities.

## Discussion

A panel of the three speakers from other EU states were joined by Erik van Zadelhoff, of IUCN Office for Europe and Bioverseas Secretariat, to discuss the issues raised in those presentations and to garner views from others present.

Eric Blencowe of Defra, on behalf UK Government representatives present, answered a question on endowment funding to say that thinking had progressed since the time of total opposition, but a special case would need to be made that endowment was warranted in a particular situation. This might result in a lengthy and unproductive process.

The panel were questioned on the issue of involvement of IUCN, rather than direct representation from OCTs and ORs in the Bioverseas initiative. It was noted that it is still early days. IUCN, with the other partners, provides a common international perspective, but nothing can be achieved without full cooperation and involvement of OCTs and ORs, including UKOTs.

On the question of involvement of Crown Dependencies, there was a commitment to cooperate, whilst recognising that there were issues relating to legalities that needed to be addressed.

On the question of the possibility of access to UK Lottery monies being organised via the Forum, it was agreed that there was a need to investigate and press for a different response from the Heritage Lottery Fund (HLF) which has previously regarded the Forum and UKOTs as being outside its scope, possibly on the basis of misunderstanding.

Suggestion was made that funding bodies be invited to future conferences to enable them to understand priorities, their urgency and speed up funding applications. It might even be productive to invite representatives from HLF.

It was noted that approaches to high net worth individuals with large villas or land holdings in Caribbean territories might be a worthwhile source of funding, especially if they are directly involved with the project on their doorstep.

Local corporate funds are accessible in some UKOTs; these are often enhanced by good public relations and personal relationships between OT NGOs and local corporations. Similarly, charitable trust grants are sometimes available through partnerships at an international level. In each instance OT NGOs should consider whether corporate financial assistance is from an ethical origin. There is also a need to share resources between territories with similar issues, for example in the Caribbean.

It was noted that it could be beneficial to acquire a contact MEP how would speak on issues affecting UKOTs and champion their cause in the European Parliament.

# The Blue Iguana Recovery Programme

Fred Burton, Blue Iguana Recovery Programme



Burton, F. 2007. The Blue Iguana Recovery Programme. pp 259-262 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The Blue Iguana, endemic to Grand Cayman, was reduced to 10-25 individuals in 2002, an estimated 90% decrease over 9 years. In effect, in 2002, the Blue Iguana became functionally extinct in the wild. Invasive species and habitat lost were major factors in this decline. This project has used captive breeding and re-introduction to increase numbers and establish viable breeding populations. A major focus has been on using the Blue Iguana as a flagship species to protect a meaningful area of Grand Cayman's unique xerophytic shrubland. The Salina reserve, of 625 acres, includes 100 acres of xerophytic shrubland, and has 90 iguanas, with over 100 more joining them by December 2006. The pilot project has proved the success of this strategy. Funding remains a critical concern, and it is crucial that long-term sustainable finance is secured, along with habitat protection.

**Fred Burton**, Blue Iguana Recovery Programme, P O Box 10308, Grand Cayman KY1 - 1003, Cayman Islands. [fjburtan@blueiguana.ky](mailto:fjburtan@blueiguana.ky)



xerophytic shrubland of Grand Cayman's east interior.

The Blue Iguana is a perfect flagship species for that xerophytic shrubland, which is badly under-represented in the Cayman Islands' protected area system. It is big and spectacular, its behaviour is easy to relate to and, above all, it goes bright blue when it wants to be noticed.



## Status

In 2002, we estimated that between 10 and 25 individuals survived, from the wild population, down 90% from the only comparable previous survey 9 years before. The survivors were dispersed, breeding was restricted to one location and, even there, the offspring were not surviving to adulthood.

## Background

The Blue Iguana Recovery Programme has grown from efforts which began on Grand Cayman in 1990. I am going to describe the time-frame mainly from 2002, which was the year the Grand Cayman Blue Iguana's remnant wild population hit the point of functional extinction.

The Grand Cayman Blue is a west indian rock iguana. This is the genus *Cyclura* which has radiated across the Caribbean, and is in serious trouble almost throughout its range.

*Cyclura lewisi* is endemic to Grand Cayman, where it once occupied coastal habitats now taken over by humans, but also the floristically diverse







*Fire ant damage on dead hatchling*



*Blue iguana "Slugger" killed by a dog*

Invasive species are a big part of the problem here, as everywhere. Fire ants and rats attack nests and hatchlings. Cats kill young up to about 2 years old. Dogs kill adults, especially nesting females.

Habitat destruction is the other big issue. Current projections suggest the Cayman Islands will have no natural areas left by the end of this century, except for those areas brought under protection in the next few years. We could save the Blue Iguana on golf courses, resort grounds and such-like, but that really is not the point: we should be able to use this species to protect a meaningful tract of Grand Cayman's unique xerophytic shrubland.

### **Recovery programme**

So far, we have developed, tested and proved our conservation strategy from a biological and practical point of view. Our pilot project in the QE II Botanic Park now has 30 free-roaming Blues with permanent territories in the Park (e.g. picture here of "Gorgeous George" in 2006).

The Park's Blues are breeding. So are the captive founders we are managing in our expanding captive and head-starting facility. We have been head-starting hatchlings from captive and Park nests, rearing the young to two years old. This has given us enough numbers to start repopulating a much larger protected area.

The Salina Reserve is 625 acres, of which about 100 acres is xerophytic shrubland, i.e. iguana habitat. There are 90 iguanas restored there now, and 114 more going out this coming December.



*"PRP" with radio transmitter*

### **Human resources**

As the programme transitions from pilot project to full scale population restoration, our recurrent budget is growing towards US\$ 200,000 per annum. This figure would be far higher but for major voluntary resources which we are fortunate to be able to access.

Our human resources include only two full-time employees on Grand Cayman, currently working



under a full-time volunteer director. Our core staff is supplemented by international volunteers during major fieldwork periods, seasonally swelling the project personnel to as many as 12 at a time, at negligible additional cost. Local volunteers, especially local service clubs, are another significant source of short-term manpower.

Overseas, the International Reptile Conservation Foundation ([www.ircf.org](http://www.ircf.org)) created and maintains the programme's web site ([www.BlueIguana.ky](http://www.BlueIguana.ky)), handles all program publications, assists in recruiting and coordinating international volunteers, raises funds, manages US purchasing of equipment and supplies, and promotes the programme throughout the USA.

The Durrell Wildlife Conservation Trust ([www.durrell.org](http://www.durrell.org)), based here in Jersey, is the programme's other key partner, raising major funds, providing skilled personnel support, and assisting in strategic programme planning.

The US zoo community is also involved, with personnel and technical assistance coming especially from San Diego Zoo, Fort Worth Zoo, the Wildlife Conservation Society, Houston Zoo, Milwaukee County Zoo, and Indianapolis Zoo.

The International Iguana Foundation has also channeled grants to us from the American Zoo Association Conservation Endowment Fund, and the Disney Wildlife Conservation Fund.



*Aerial view of Captive Breeding Centre*

## Financial resources

To date approximately 50% of the programme's annual expenditure has been met by local corporate grants. The balance has been met from overseas

grant sources, especially those channeled through the programme's overseas partners.

Local corporate grants that we have been able to access typically run in the range US\$ 5,000 to 20,000 per grant, and it is extremely difficult to get serious consideration for applications in excess of \$100,000. In recent years we have been raising between \$50,000 and \$150,000 per annum from these sources. Charitable residues of Special Purpose Financial Vehicles, which are a notable element of the Cayman Islands' offshore financial industry, are one key source. Corporate sponsorships, linked to branding and publicity, are also important. In accessing these funds we are always in competition with other local charitable initiatives, especially socially oriented charities. However, personal contacts with the key decision-makers (often a single person or a very small group) are the critical factor in securing these grants.

Ultimately, we need about 1,000 Blues in the wild, from at least 20 different founder lines. We are on course to achieve that, but only if we can protect enough shrubland habitat to support that many. The Salina's shrubland just isn't extensive enough.

We are looking at two options, hoping to leverage the small amount of Crown land that we might be able to incorporate. For the rest, we will have to raise the funds to buy privately owned land. It is the only real option in the Cayman Islands social and legal framework, and it is going to cost some millions.

This substantial capital expenditure is beyond the scope of the funding options we currently have access to. There are no UK government grant sources in this league, local corporate grants rarely exceed tens of thousands of dollars, and many major international grant sources are not simply available to UK Overseas Territories, as a result of constitutional relationships. The Cayman Islands Government's so-called "Environmental Protection Fees" should be the primary source of this kind of funding, but to date they have been variously misused to substitute for government's recurrent expenditure, and have rarely been applied to conservation land purchase. Discussions earlier in this session about changing policies in the EU, and the possibility of UK/France/Netherlands collaboration to bring EU funds to bear on conservation in their respective territories in the Caribbean, are therefore of great interest.





*Tour with "Forrest"*

## Sustainability

Long term, once the capital costs of land protection are met and the population restoration of Blue Iguanas is complete, there will still be ongoing costs to be met. The causes of the original decline of the Blue Iguanas are still present, and any large protected area with Blue Iguanas must have ongoing management. In particular cats and dogs must be permanently excluded or at least continually controlled.

We are looking at expanding commercial activities, such as guided tours and retail products, to generate the sustainable funding that will be needed to maintain this effort indefinitely. Maintenance costs, such as staff salaries, are always the most difficult to meet by short-term grants, and this will only become even harder once the iguanas cease to be so critically endangered. An endowment is the only credible alternative (or supplement) to commercial activities set up to fund the programme.

## Conclusion

So that is where we stand today – the Blue Iguana is a species we can certainly save. The question is: how effectively can we leverage this successful conservation story to preserve the habitat this species belongs in, with all the biodiversity values that go along with that?



*Yearlings eye*



# Support through volunteers

## John Cortes, Gibraltar Ornithological & Natural History Society



Cortes, J. 2007. Support through volunteers. pp 263-268 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

There is a need for both resources and resourcefulness. Resources are needed to obtain 'the four Ps' – People, Premises, Projects and Props – but some of these can be obtained without funds. Use of local resources is essential, be it schools, clubs, societies, military or other volunteers. Engagement is at the heart of all these activities, especially if local conservationists are to gain respect and influence. Resources are there to be used and small organisations in small places should be willing to use more resources than they have – even if they are somebody else's.



**Dr John Cortes**, Gibraltar Ornithological & Natural History Society, P O Box 843, Gibraltar. [jcortes@gonhs.org](mailto:jcortes@gonhs.org)



4 birdwatchers and a £250 budget, no staff and no premises, to a Society with about 400 members, a (largely restricted funding) budget of about £200,000 pa, seven staff and 5 premises. This happened due to commitment to move forward, without waiting around for the resources to appear.

Funds are needed to obtain "the four Ps", People, Premises, Projects and Props. Some of these can be obtained without funds, however.

People can be volunteers. Premises can be allocated (in Gibraltar we have obtained former MOD premises for our use). Projects can be volunteer-run. Props can sometimes be do-

The aims of nature conservation NGOs include the achievement of environmental stability, biodiversity conservation and enhancement, and scientifically based species and habitat management. In order to achieve this, and more, we need both resources and resourcefulness.

In the example of Gibraltar, we are faced with a small territory (7 km<sup>2</sup>), with 28,000 inhabitants. This means both limited resources and tremendous pressure on space. The Gibraltar Ornithological & Natural History Society (GONHS) has grown, in the 30 years since its foundation in 1976, from a small club with





- Continuous monitoring of seabird migration
- 44,401 birds ringed up to end of 2005



- Thorough knowledge of nesting bird community
- Full inventory of higher plants
- Ongoing cataloguing of invertebrates.

nated, but is perhaps the “P” that most depends on financial resources to acquire.

Non-funding, activity-based resources can include the use (not abuse) of schools, clubs, societies, the military, other volunteers. But is this always practical? They often have so much else to do, and in any case, is it enough, and are they really going to take our aims in the direction we want?

The best volunteers are those who will work within the NGO’s structure. They don’t need to be many, but it is best if they are good at:

- running the organisation
- running activity groups
- providing data
- keeping in the public eye.

You can come to depend on them (although this in itself can become a problem when one day they are not there).

Some of what has been achieved in our situation over the years includes:

- Continuous monitoring of raptor migration since 1967



One inexpensive and vital form of non-funding resources is Influence, which, among its many representations can include:

- Networking
- Getting around
- Knowing who to talk to and talking to them
- Using the media
- Using active websites

Influence is useful when tackling other resources that we seek, such as:

Support from

- the Public
- Organisations
- Authorities/Government
- International bodies
- the Membership
- Business, including developers and the like (even if they are sometimes the “enemy”!).

Influence is something that must be worked on. It helps if key organisation members are well known – appear in the local media, including TV, radio and newspapers, give talks to schools and associations, etc. It also helps if the organisation has one notable success which catches the public eye. In Gibraltar, convincing the planning authorities after a lengthy public campaign, to deny a wealthy developer from building a funicular railway to the top of the Rock gained GONHS great respect and credibility.

Once respect has been gained, it is important to engage with those entities which may either help

the organisation, or against whom you may have a battle to fight (e.g. a development planned for a sensitive wildlife area). The same entity may fill both roles on different occasions.

Their respect is important because they have to take you seriously. There must be no empty threats or your bluff will be called and you will be left looking silly.

Let them in particular worry about their public image:

- they must know you will embarrass them if you have to.
- make them realise that they can become your friends.
- never compromise on principles, only on those things you are genuinely willing to concede in the first place.
- use the public.

Engage with the authorities (usually the local Government, but in some territories also others, such as the Ministry of Defence):

- Be able to provide a service that they will find useful. This will often be expertise in the field of ecology. Be willing to offer genuine advice in good faith – even if this is free.
- Genuinely gain their confidence.
- Be available to offer advice and support.
- Congratulate them when they act positively.
- Convince them there is no-one better to have on side (and make sure there isn't)!
- Be willing – and let them know you are – to work on and make the most of public support.
- Be serious about your priorities and principles and never compromise on them. They will then know you'll go to the Press, or take them to Court if you really have to.

When considering a project from which you want practical results:

- Never be afraid of the scale of your project.
- If it is important, do not hold back through lack of funds.
- Do it yourself, or get someone else to do it for you.

Engage with businesses, make good use of friends and kindred institutions and organisations (including Museums, Botanic Gardens, etc.).

Credibility is helped, and sound conservation practice requires, a good scientific base. Small territories often do not have sufficient people with

the right training, experience or qualifications. NGOs should encourage members and other local or locally-based people to acquire such knowledge, but much can come from outside. Contacts are often readily available from institutions in the UK, or elsewhere, depending on the territories' location. Gibraltar often works with European universities, some South Atlantic territories work with South African institutions, etc. In order to attract students and others to work in the territory, the following are useful:



- Premises for accommodation and as a base for field work
- A small but fairly well-stocked library concentrating on local species/habitats and on the disciplines of interest or that are being worked on.
- Basic laboratory facilities
- Easy access to field locations
- Interesting subject matter
- Collaboration agreements.

Collaboration agreements in particular are vital. They must clearly set out the terms under which all research is carried out. We recommend joint ownership of data and full rights to use these, even if unpublished, if they will assist in achieving conservation aims. Co-authorship of publications, if appropriate, should also be covered.





## Some cases from Gibraltar

### The Great Sand Slopes of Gibraltar's Mediterranean coast



Water catchment sheets covering the East Side sand slopes 1989 (above)



Part of sheets removed. Regeneration of vegetation under way - 1999 (above); All the sheets removed and matting laid down  
Regeneration of vegetation progressing well - 2003 (below)



Vegetation covering the entire surface of the slopes  
The matting is degrading rapidly - 2005

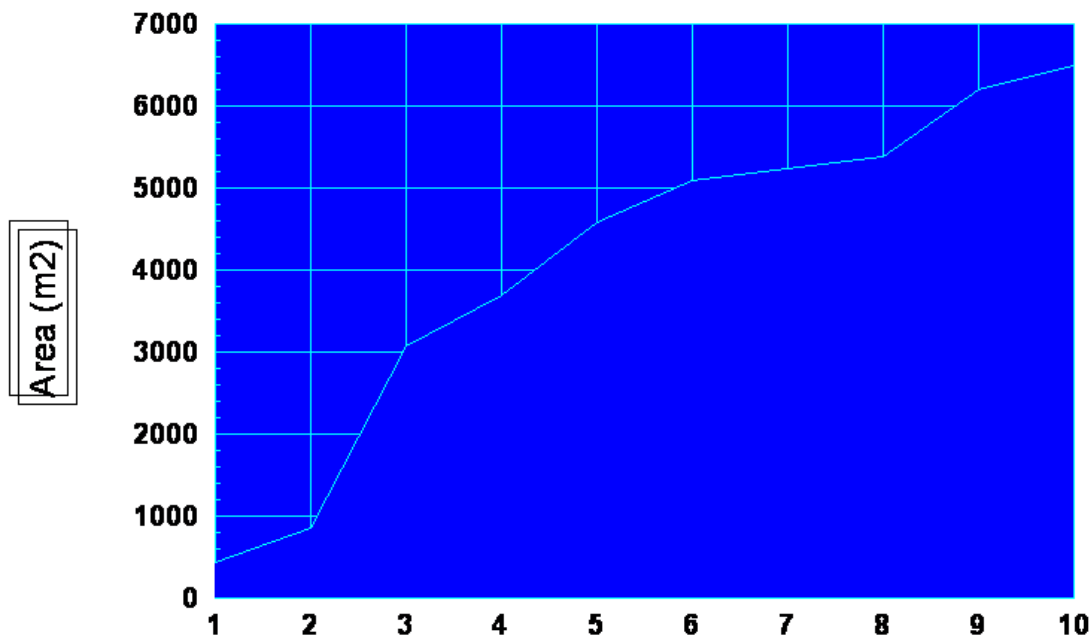


Regenerated East Side sand slopes from below

### The Artificial Reef of Gibraltar's south-western coast



## Growth of the Gibraltar Artificial Reef to 1995



**What will result from the use of the resources?**

Knowledge  
Practical conservation achieved  
More support

In Gibraltar, this success has led, for example, to:

- Representation in Committees/Commissions
- Ongoing consultation
- Getting on their minds, and hopefully under their skin,

leading to:

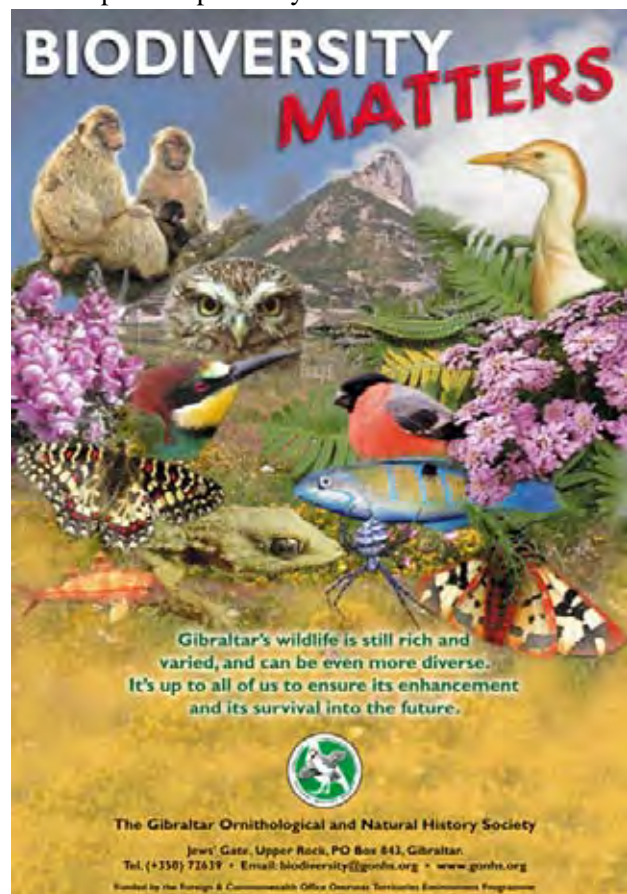
- Government contracts
- EU structural funds (ERDF) £97,000 + £30,000
- EU INTERREG FUNDS (Gibraltar-Morocco) (£150,000)
- OTEP funds (Gibraltar Biodiversity Action Plan)
- Important Bird Areas (IBAs)
- Natura 2000 Candidate Special Areas for Conservation (cSACs) under the EU Habitats Directive
- Gibraltar's Environment Charter (a different arrangement to those for other UKOTs).

### Conclusions

In conclusion, then:

Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, page 267

- Know your aims
- Keep to your principles
- Be totally and relentlessly devoted
- Do not forget your roots
- Keep in the public eye





- Gain recognition and respect
- Do not hesitate – go for it!

And finally, some thoughts to ponder on:

- Resources are there to be used, not stored or banked where they will invariably expire or lose value.
- Large organisations in large places tend to have more resources and work within these, always needing money in the bank.
- Small organisations in small places cannot afford to wait or to store. They should be willing to use more resources than they have – even if they are somebody else's!





# RSPB's Sabbatical Programme

Sarah Sanders, RSPB



Sanders, S. 2007. RSPB's Sabbatical Programme. p 269 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

After working at the RSPB for 7 years, all RSPB employees qualify for a four-week sabbatical on full pay. It can involve doing a project that specifically supports the work of the RSPB or is more broadly conservation related.

When thinking about potential sabbatical projects, remember that RSPB staff are not all ornithologists. There are a range of skills that can be drawn upon. These include fundraising, marketing, membership, advocacy, strategic planning, GIS, environmental education and so on.

Previous RSPB sabbaticals in the UK Overseas Territories have included:

- a. Bird Monitoring in Anguilla
- b. Wardening at Volunteer Point, Falklands
- c. Computerising David Wingate's fieldnotes, Bermuda.

Although RSPB staff can receive up to £750 to assist with the costs of a sabbatical, it does help if the Territories can offer support with local transport and accommodation as these costs tend to be much higher than other parts of the world.

It is much better to be proactive rather than responsive. There is considerable interest at the RSPB to visit the UK Overseas Territories so please do send in your ideas for sabbaticals (project outline, costs, timing and skills required). They will then be advertised in the RSPB sabbatical catalogue. This is illustrated in the following example:

*The Project: Falklands Conservation have one or two spaces available for assistants on a rat eradication programme. This would involve all of August in the Falklands, based initially in Stanley and then going out to offshore islands to undertake baiting (warfarin based) programmes to clear islands of introduced rats. Most trips around 1 week involving camping in often cold and uncomfortable conditions (mid-winter) on uninhabited islands.*

*Additional Information: You would need to be fit and generally operate well in field conditions joining a team of two FC researchers and other local volunteers in carrying out the work so you must be able to fit into a small team and able to 'muck in' in a field situation. Minimum of four weeks would be required, although five would be ideal. Top-up funds for flights and accommodation to the Falklands would be provided.*

*When: August / all year round*

*Contact: <mailto:grant.munro@conservation.org.fk>  
[www.falklandsconservation.com](http://www.falklandsconservation.com)*

**Sarah Sanders**, Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 3JH, UK. [sarah.sanders@rspb.org.uk](mailto:sarah.sanders@rspb.org.uk)

# Capacity Building at the Royal Botanic Gardens Kew

Colin Clubbe, Royal Botanic Gardens, Kew



Clubbe, C. 2007. Capacity Building at the Royal Botanic Gardens Kew. pp 270-271 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

For over two centuries, staff at the Royal Botanic Gardens Kew have been actively committed to sharing information and expertise with colleagues from other botanical institutions around the world. As the need for specialist skills in botany, horticulture and conservation increased, RBG Kew responded by establishing a series of international diploma courses to provide training in identifying and conserving biodiversity and in using it sustainably. The continuing need to build capacity for the conservation of plant diversity is highlighted in two key commitments made by global conservation community of the end of the twentieth century: the Convention on Biological Diversity (CBD) and the Global Strategy for Plant Conservation (GSPC). Article 12 of the CBD and Target 15 of the GSPC highlight this need to help build capacity to conserve, sustainably utilize and manage our botanical resources. These have become the two key drivers for the further development of Kew's capacity building programme at home and internationally.

The summer school programme at Kew is now well established and four courses are regularly run at Kew over our summer period (July-August):

- Plant Conservation Strategies
- Botanic Garden Management
- Herbarium Techniques
- Botanic Garden Education

Full details can be found on our website at: <http://www.kew.org/education/highered.html> We actively encourage applications from UK Overseas Territories and will help to try and locate funding to attend these programmes.



Course leaflets

The international diploma programme at Kew is now well established and 377 practitioners from 103 countries have participated in this programme over its 20-year history. This in itself is an important contribution to Target 16 of the GSPC –“networks for plant conservation activities established or strengthened at national, regional and international levels”. Designed to provide specialist training for people working in botanic gardens, arboreta, herbaria and other conservation organisations, these courses bring together participants from around the world. Through lectures and workshops with staff from RBG Kew and other international conservation bodies and visits to other UK organisations, they explore a wide range of topics related to their chosen disciplines. Specialist options and projects enable each participant to become more confident in developing plans for implementation at home. By exchanging ideas and sharing problems amongst themselves, participants from different countries often discover common solutions. Funding for participation in this programme remains a challenge, but solutions are being found. For some participants, their home institution is able to sponsor participation either from core funds, directly from a Government Ministry or as specified in a technical training budget line of a project. Recent examples of the latter are within Darwin Initiative funded projects ([www.Darwin.gov.uk](http://www.Darwin.gov.uk)). Others have been successful in gaining Winston Churchill traveling fellowships ([www.churchilltrust.com.au](http://www.churchilltrust.com.au)), or grants from educational charities. We strongly encourage applicants to register their interest for course participation early so that help in securing funding can be provided.

Long after a course ends, the links between its participants remain strong through individual contacts and through the wider network of International Diploma alumni and its regular newsletter OnCourse ([www.kew.org/education/highered.html](http://www.kew.org/education/highered.html)).

In recent years we have been responding to requests for developing regionally-based training programmes in collaboration with in-country partners and most recently to specifically address the implementation of the GSPC. Courses have been held recently in Uganda and Montserrat.

**Dr Colin P. Clubbe**, Head, Conservation & Higher Education, Herbarium, Royal Botanic Gardens Kew, Richmond, Surrey, TW9 3AB, UK. [c.clubbe@kew.org](mailto:c.clubbe@kew.org)



*The graduating class of 2007 Plant Conservation Strategies course*



# Major Project Needs Requiring Resources both Financial and Non-Financial – a framework

Nigel Crocker, UK Overseas Territories Conservation Forum



Crocker, N. 2007. Major Project Needs Requiring Resources both Financial and Non-Financial – a framework. pp 272-281 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

There is an urgent requirement to prepare a biodiversity inventory and threat assessment to inform discussion and solutions relating to priority needs in each of the UKOTs. This is especially so when considering the high level of endemism and unique habitats and ecosystems represented in the UKOTs, and threats to their future existence and conservation management. There are numerous cross-cutting environmental issues which provide focus for project needs in the UKOTs, which may be classified under broad headings, whilst appreciating that there are a wide range of underlying needs specific to individual territories. Nevertheless, there are opportunities for synergies and leveraging of resources. To inform decisions on scoping, planning and implementing future projects there is a need to understand the scale. Whilst precise costing may not be possible at the outset there is an urgent requirement to identify priority needs so that the Forum can look for synergies and economies of scale that enable approaches to be made to UK Government and others to lobby for future funding.

**Nigel Crocker**, Treasurer, UK Overseas Territories Conservation Forum, Salida, The Street, Ubley, Bristol BS40 6PN, UK. [nigelberylcorax@btinternet.com](mailto:nigelberylcorax@btinternet.com)

## Introduction

The purpose of this paper is to record and highlight the major project needs in the UK Overseas Territories (UKOTs) and Crown Dependencies, and discuss ways and means of finding resources to perform the actions required to meet those needs. (For simplicity, this document does not specifically include Crown Dependencies at each mention of UKOTs, but we assume that most references are relevant to include them; we welcome specific guidance from Crown Dependency colleagues.)

It is important that the document addresses broad conservation needs, and does not limit its scope to those few which can be covered by existing funding mechanisms. If there is to be any chance of securing new funding sources, it is essential that the scope of resources needed is assessed and (as far as possible) costed. The estimated costs for each programme need not to be too precise initially, but can become increasingly so with time. It is intended that this will be a living document in that it will commence with what is initiated at the conference in Jersey and will be available subsequently to be

supplemented and enhanced with other needs as and when they arise.

The Resources session at the conference will therefore concentrate on collation of the initial information on needs. It will also aim to learn from the experience of those who have found resources to meet specific needs, and look at the problems of securing resources. There will be links here with the environmental education session where, in considering good practice in environmental education, opportunities offered by wider human and other resources will be explored.

## Biodiversity inventory and threat assessment

The high level of endemism and unique habitats / ecosystems represented in the UKOTs makes it imperative that we have an increasingly complete knowledge of local biodiversity and the threats that it faces. Ideally, this information would be held in a database, which could act as a central reference point that is easy to update and access, especially when issues arise within each UKOT. It is appreci-

ated that some work has already been undertaken in this area, and the database on the Forum website is evidence of this, but we must ensure that this does not become a time capsule, but is updated regularly and expanded.

There is an urgent need to fill the gaps in our understanding of what natural and other heritage resources exist (and their status) across the UKOTs. To this end, baseline biodiversity surveys are still required for many taxa in most UKOTs, simply to provide checklists of species which occur there. Even for better studied taxa, there is a need for more detailed information on status: initial data on distribution and abundance, on-going monitoring to assess changes in status, and assessment of factors driving changes in status – particularly threats. Such information underpins formal status assessments, such as the compilation of Red Lists. There is also a need for greater understanding of the ecology of species, particularly those whose status give cause for concern. To prepare any management plan for species recovery, for example, there is a need to understand specific habitat requirements and other factors critical to the survival of the species in question.

In summary, the following are key headings for information needs on species. These should be reproduced under broad taxonomic headings (i.e. the following are all required for i) plants, ii) birds, iii) reptiles, iv) beetles, v) fungi, etc., etc.:

- Occurrence (which species are present?)
  - o Trends (which species have become extinct, or arrived only recently?)
- Distribution (where does each species occur?)
  - o Trends (is the range of each species stable / increasing / decreasing?)
- Abundance (how many of each species occur?)
  - o Trends (are populations of each species stable / increasing / decreasing?)

Alternatively, these needs could be expressed in terms of activities and outputs:

- Biodiversity surveys for the compilation of checklists of species present
- Biodiversity surveys and monitoring programmes for the preparation and updating of distribution maps for species
- Biodiversity surveys and monitoring programmes to obtain and update population estimates for species

‘Preparation of Red Lists’ could be taken as an over-arching activity/output, as a comprehensive

Red List requires all three elements of species-level information noted above, and points the way to targeted species recovery programmes. Once species in particular need of conservation attention have been identified, additional information is required for the development of a species recovery programme, such as:

- Threats to the survival of the species
- Ecological requirements of the species

Similar levels of baseline information (i.e. on occurrence, distribution, abundance and threats) are required for habitats, and ideally for ecosystems (although species assemblages may be a more practical alternative). The concept should also be extended to consider, for example, geological and landscape features, and might be further expanded to take account of built (as well as natural) heritage features.

Effective conservation of biodiversity demands that acquiring such baseline information, and on-going monitoring, is conducted in a more or less systematic fashion. This requires that significant local infrastructure and information management capacity is in place. As such, another over-arching activity/output which should be considered here is ‘Establishment of an Environmental Records Centre’ for each UKOT. In general, where project implementation relies heavily on technical input and expertise from elsewhere, opportunities should be taken to enhance local infrastructure and capacity as part of the project’s core activities.

### **Cross-cutting environmental issues**

A range of cross-cutting environmental issues provide further foci for project needs in the UKOTs. These include broad headings such as:

- Implementation of Environment Charters
- Establishment/management of Protected Areas
- Environmental education
- Environmental legislation
- Environmental democracy
- Climate change
- Habitat loss/restoration
- Invasive species
- Sustainable use of biodiversity
- Institutional capacity for conservation

Under each of these (and other) broad headings, a wide range of specific needs may apply in any given UKOT. A first requirement may be the development of a local strategy (such as that required under the Environment Charters) through which to

address the cross-cutting issue. The development of such a strategy will help to identify particular needs (as well as existing assets in the relevant area). Individual projects can then be identified which address specific, priority needs. For example, sub-headings for needs under the broad heading of 'Invasive species' might include:

- Information/awareness
  - baseline data on invasive species already present and their impacts
  - data on potential invasive species threats
  - co-operation with regional/international bodies
  - awareness-raising at all levels of society
- Prevention/detection
  - identification of key pathways for introductions
  - risk assessment
  - implementation of monitoring/surveillance measures
  - cross-sectoral communication
  - co-operation with regional/international bodies
- Control/eradication
  - identification of priority species for control/eradication
  - implementation of control/eradication measures
  - habitat restoration following control/eradication

As with biodiversity inventory needs, infrastructure and technical capacity are key considerations when addressing needs under cross-cutting environmental issues. Taking invasive species as an example again, there may be a need to establish a central co-ordinating body to oversee development and implementation of strategy, as well as (for example) infrastructure to screen goods arriving at ports of entry, and even a native plant nursery to provide landscaping material as an alternative to suppliers of imported, exotic species. As noted above, projects which rely on external expertise should include capacity building as a core component, to enhance prospects for long-term sustainability of project outputs (and potential for increasingly locally-led activities in related areas).

### **Opportunities for synergies and leveraging of resources**

As well as defining the range of projects which are needed, we need also to look at opportunities for synergies with existing activities, and for leveraging resources using existing assets. In other words,

how can much needed projects be enhanced, and made more attractive to prospective funders, through linkages to existing infrastructure, local (and wider) demand, and global priorities?

Examples of considerations in this area include:

- local government planning policy and its integration with conservation and sustainable use
- local education policy and programmes
  - schools / colleges
- public awareness of conservation issues (e.g. species under threat of extinction, the threats posed by invasive species)
- self-help – local community commitment through ownership and guardianship
- sustainable development which enhances biodiversity conservation - enabling local people to live within an economy that supports their way of life, whilst recognising the need to manage resources for the future benefit of the community and the environment, e.g.:
  - widespread conservation of mangrove belts to provide hurricane protection in the Caribbean
  - links to food, forestry and farming e.g. sheep farming in Falkland Islands and some farming and forestry in St Helena
  - water-catchment management, for which natural vegetation has been shown to be very important
  - sustainable nature-based and cultural tourism
  - links to fisheries (fishing represents a major source of income for the South Atlantic UKOTs, as well as some local fishing within the Caribbean UKOTs) - our knowledge on the sustainability of these activities is insufficient given issues such as:
    - o impact of long-line fisheries
    - o impact of rise in ocean temperatures leading to redistribution of fish into other waters or becoming unsustainable
    - o impact of fishing on sea-birds, especially albatross and petrels in South Atlantic both direct and indirect
    - o impact of variable annual cycle (eg South Georgia)
    - o impact of foreign vessels fishing in UKOT waters
    - o need to maintain a system of management that ensures the future of ocean and sea bird biodiversity
- external education opportunities (e.g. for rangers / wardens via schemes such as those run by Royal Botanic Gardens (RBG) Kew)
- species recovery / restoration (see above)
- bird monitoring surveys as undertaken in UK,



but not currently widespread in UKOTs – British Trust for Ornithology (BTO) surveys might be used as a framework (note also the bird monitoring workshop after this conference)

- use of volunteers to carry out survey / conservation work – UK examples from BTO / County Trusts / Conservation Volunteers
- use of visiting tourist volunteers – many visiting eco-tourists already keep records of what they see, but these records are not always copied to local organisations / recorders
- ensuring that there is a local recorder to collate records of all reported flora and fauna
- greater liaison between UKOT NGOs and UK based organisations to share expertise and assist in the training and encouragement of local UKOT participants
- UKOT governments note the financial plus attached to these activities particularly from visiting tourists adding to the local economic purse – use of taxation to build a resource for sustainable management of the environment

A key consideration in maximising synergies and leveraging resources is local community involvement. In some cases, the initial call for particular projects arises from within local communities themselves (as with the on-going biodiversity management and eco-tourism initiative in TCI). Advocacy in support of projects is particularly powerful when it involves non-scientists informing other parts of the local community of the underlying need, and highlighting the value of a diverse environment in which to live. If local people generally (as well as conservation NGOs and departments) understand the problem, and the consequences of inaction, they are more likely to support interventions and own the solution, if not provide some of the resources to resolve underlying issues. In this respect, public awareness-raising is analogous to technical capacity building, and elements of environmental education (in the broadest sense) should be included in most, if not all, projects.

### **Scoping, planning and implementing projects**

Projects must be scoped to address these issues as a matter of urgency. Some work may be capable of being done largely by self-help (but will still need some resourcing) whilst others might involve costly, externally funded programmes. The bird restoration programme on Ascension Island is a case in point, where very major funding and expertise were required to ensure a successful feral cat

eradication and rat control programme.

When projects advance from scoping to planning (and development of concrete proposals, grant applications, etc.), careful consideration must be given to project design and management, to enhance prospects for funding and to ensure that all projects are implemented in a manner that will ensure their success. There will be many common issues, processes and experiences that can be shared across UKOTs in this respect, and lessons to be learned which will provide a general framework for project planning and implementation. Establishing that framework will ease the task of calculating the resource requirement for each project, and (to an extent) assist in identifying the sources from which resources might be drawn. Once again, this is fundamentally an issue of infrastructure and technical capacity (this time for project management in general), and opportunities to enhance these should be taken wherever possible as part of the process of designing and implementing individual projects.

### **Government support: UK and UKOT**

Financial support specifically for the UKOTs is provided through OTEP, but this is only seed finance and there is still a requirement for UKG to provide additional funds to support a range of projects and activities. UKOT Governments also provide financial support for some conservation activities, for example, through environmental taxes levied on tourists which are subsequently used as a resource to address environmental needs. Where they do not already exist, it may be appropriate to develop stakeholder forums locally to assist UKOT Governments in identifying priority needs for such financial support.

As well as contributing to financial support, UKOT Governments often play a vital role in implementing conservation projects and enhancing local community involvement and ownership, although such activities often fall to small, local NGOs. Ideally, such activities are undertaken in partnerships between governments and NGOs (and, in some cases, the private sector). The example of the Bahamas is a case in point, where the government transfers ownership of all protected areas to the local National Trust (NT) for the NT to manage. There is a clear example here to UKOTs also to establish NGOs as the primary custodians of protected areas, in partnership with government, as part of a wider portfolio of responsibilities. Strong partnerships of this kind are dependent on (government and NGO)

institutional capacity, and on UKOT governments' willingness to make use of civil society in all its richness. The Forum and its member organisations can play a crucial role in helping UKOT governments and NGOs to maximise the value of partnerships.

## Counting the cost

Whilst we have identified that some self-help might be possible in some instances, in reality all projects do require financial resourcing at some level. Whether this is provided within UKOTs locally or from external sources will to a large extent depend on the size and complexity of the project.

Each UKOT will have a number of specific needs and there will be other core needs (i.e. in relation to infrastructure and technical capacity) that might affect all or a number of UKOTs. The following section provides the means to build a matrix of the need areas and to identify where needs are specific to given UKOTs or common across a group of UKOTs with close geographical, habitat-based or other links.

Needs might be easy to identify, although their costs may be unknown. The sharing of knowledge and experience can assist in extrapolating the cost of a similar project elsewhere, to arrive at a cost calculation of the resource requirement, which can be progressively refined from order-of-magnitude to costed project.

Please see appendix which attempts to provide a structure to quantify and summarise actions and costs and includes some examples for guidance and comparison with similar situations in other UKOTs. These are by no means exhaustive, so please feel free to add to each of these matrices and to add any additional matrix that you feel should be included.

## Conclusion

This is only the beginning of what might become a point of reference and resource for UKOT NGOs and others who are seeking to plan, and seek significant resources for, environmental projects. Please be involved in the process. You and others will be glad you did.

## Additional notes concerning completion of the Appendix to Major Funding Needs Requiring Resources – a framework arising from discussion with participants of the Wider Caribbean Working Group in Jersey 11th October 2006

The Resources Session at the conference introduced a template as the appendix referred to above. As discussed this is a living document and its use will develop and change over time in response to the needs of individual and collective territories. Those needs will vary from large scale projects, where it might be possible to leverage some common approach involving more than one territory, to smaller tasks which can be addressed locally, either financially, through practical help or both. The template should therefore be used for all projects and is to be considered as inclusive of the small as well as the large.

In the first instance it was agreed that all territories should define their top three priorities within their territory in the short to medium term. These might include:

- Urgent action to control / eradicate invasive species
- Restoration of habitat
- Species recovery
- Environment charter commitments / implementation
- Education initiatives
- Local initiatives for reserve management
- Core activities of local NGO
- Others – (this is only a suggested list to inform thoughts and is not exclusive)

Secondly, consider how those three priority areas may be resourced:

- Local funding from territory Government, corporate or NGO source
- Application for funding to UK Government (eg OTEP)
- Link to similar issues in other territories (this will inform UKOTCF Council in considering what might be possible through partnership with other EU member states, as well as considering further approaches to UK Government and other funding bodies where applicable)
- Use of local volunteer assistance (NGO personnel – members / enthusiasts)
- Use of educational activity linked to volunteer

assistance –schools and adults

- Use of informed eco-tourists to provide data on species sightings etc.

Having identified the three top priorities for your territory, this information should be fed to the Forum Treasurer Nigel Crocker preferably by e-mail – nigelberylcorax@btinternet.com, to enable him to begin to collate a database of projects with a common theme, and to identify key needs areas within each territory. Please use the template as far as possible to enable information to be collated in a standard format, but please feel free to change the detail to fit individual circumstances.

As an example of common interests, you will recall that JNCC has already prepared a detailed database of invasive species for overseas territories, and it is possible that we might consider a similar unified database for indigenous species, collating information already available and filling the gaps in our collective knowledge.

**Appendix to Major Funding Needs Requiring Resources - a framework  
Counting the cost of addressing major project needs and financial resources required**

**Biodiversity inventory and threat assessment**

Project		Taxa to be recorded (for example - there will be others)				Cost
		Action	Birds	Plants	Invertebrates	
Recording status of all taxa		Initial identification				
<ul style="list-style-type: none"> <li>• Occurrence (which species are present?) <ul style="list-style-type: none"> <li>o Trends (which species have become extinct, or arrived only recently?)</li> </ul> </li> <li>• Distribution (where does each species occur?) <ul style="list-style-type: none"> <li>o Trends (is the range of each species stable / increasing / decreasing?)</li> </ul> </li> <li>• Abundance (how many of each species occur?) <ul style="list-style-type: none"> <li>o Trends (are populations of each species stable / increasing / decreasing?)</li> </ul> </li> </ul>			<ul style="list-style-type: none"> <li>• Checklist</li> <li>• Species distribution maps</li> <li>• Population estimates</li> </ul>	<ul style="list-style-type: none"> <li>• Checklist</li> <li>• Species distribution maps</li> <li>• Population estimates</li> </ul>	<ul style="list-style-type: none"> <li>• Checklist</li> <li>• Species distribution maps</li> <li>• Population estimates</li> </ul>	
Through the implementation of:			<ul style="list-style-type: none"> <li>• Up-dated checklist</li> <li>• Records of distributional changes</li> <li>• Records of population trends</li> </ul>	<ul style="list-style-type: none"> <li>• Up-dated checklist</li> <li>• Records of distributional changes</li> <li>• Records of population trends</li> </ul>	<ul style="list-style-type: none"> <li>• Up-dated checklist</li> <li>• Records of distributional changes</li> <li>• Records of population trends</li> </ul>	
<ul style="list-style-type: none"> <li>• Biodiversity surveys for the compilation of checklists of species present</li> <li>• Biodiversity surveys and monitoring programmes for the preparation and updating of distribution maps for species</li> <li>• Biodiversity surveys and monitoring programmes to obtain and update population estimates for species</li> </ul>		establish and implement surveys				
Design monitoring programmes and management plans		ongoing monitoring and management planning				
Ongoing activities and management		ongoing monitoring and management implementation				



Cross-cutting environmental issues

Project		Action	Invasive species	Project specific actions (for example)		Cost
Broad environmental issues				Environment	Charters	
<ul style="list-style-type: none"> <li>• Implementation of Environment Charters</li> <li>• Establishment/management of Protected Areas</li> <li>• Environmental education</li> <li>• Environmental legislation</li> <li>• Environmental democracy</li> <li>• Climate change</li> <li>• Habitat loss/restoration</li> <li>• Invasive species</li> <li>• Sustainable use of biodiversity</li> <li>• Institutional capacity for conservation</li> </ul>		development of a local strategy through which to address the cross-cutting issue				
<p>(by example for 'Invasive species' actions might involve:)</p> <ul style="list-style-type: none"> <li>• <b>Information/awareness</b> <ul style="list-style-type: none"> <li>• baseline data on invasive species already present and their impacts</li> <li>• data on potential invasive species threats</li> <li>• co-operation with regional/international bodies</li> <li>• awareness-raising at all levels of society</li> </ul> </li> <li>• <b>Prevention/detection</b> <ul style="list-style-type: none"> <li>• identification of key pathways for introductions</li> <li>• risk assessment</li> <li>• implementation of monitoring/surveillance measures</li> <li>• cross-sectoral communication</li> <li>• co-operation with regional/international bodies</li> </ul> </li> <li>• <b>Control/eradication</b> <ul style="list-style-type: none"> <li>• identification of priority species for control/eradication</li> <li>• implementation of control/eradication measures</li> <li>• habitat restoration following control/eradication</li> </ul> </li> </ul>		development of a local strategy through which to address this issue and its resolution	<ul style="list-style-type: none"> <li>• List of invasive species present</li> <li>• List of key species</li> <li>• List of key pathways</li> </ul> <p>Outputs</p> <ul style="list-style-type: none"> <li>• Early detection of new species</li> <li>• Updated list of key species</li> <li>• Updated list of key pathways</li> </ul>			
<p><b>Design monitoring programmes and management plans</b></p> <p>Ongoing activities and management</p>		ongoing monitoring and management planning ongoing monitoring and management implementation				

Opportunities for synergies and leveraging of resources

Project	Action	Local education policy and programmes – schools / colleges	Project specific actions (for example)	Cost per annum
Local government planning policy and its integration with conservation and sustainable use				
Local education policy and programmes – schools / colleges				
Public awareness of conservation issues (eg. species under threat of extinction, the threats posed by invasive species)				
Self-help – local community commitment through ownership and guardianship				
Sustainable development which enhances biodiversity conservation - enabling local people to live within an economy that supports their way of life, whilst recognising the need to manage resources for the future benefit of the community and the environment				
External education opportunities (e.g. for rangers / wardens via schemes such as those run by Royal Botanic Gardens (RBG) Kew)				
Species recovery / restoration	Initial planning to define scope of work involved - many of the self-help / volunteer effort needs to be supported by an infrastructure that provides tools that sustain these activities even if only to the extent of providing recording methods and document. Others such as species recovery and restoration will require greater levels of funding, some of which will be required from external sources	<ul style="list-style-type: none"> <li>Awareness-raising</li> <li>Education programme (schools)</li> <li>Review of current activity</li> <li>Leading to</li> <li>Updated programme</li> </ul>	<ul style="list-style-type: none"> <li>Awareness-raising</li> <li>Education programme (public)</li> <li>Review of current activity</li> <li>Leading to</li> <li>Updated programme</li> </ul>	
Bird monitoring surveys as undertaken in UK, but not currently widespread in UKOTs – BTO surveys might be used as a framework				
Use of volunteers to carry out survey / conservation work – UK examples from BTO / County Trusts / Conservation Volunteers				
Use of visiting tourist volunteers – many visiting eco-tourists already keep records of what they see, but these records are not always copied to local organisations / recorders				
Ensuring that there is a local recorder to collate records of all reported flora and fauna				
Greater liaison between UKOT NGOs and UK based organisations to share expertise and assist in the training and encouragement of local UKOT participants				
Facilitate UKOT governments in noting the financial plus attached to these activities particularly from visiting tourists adding to the local economic purse – use of taxation to build a resource for sustainable management of the environment				

Project	Action	Project specific actions (for example)			Cost per annum
		Local education policy and programmes – schools / colleges	Public awareness of conservation issues		
<p>(by example - some funding needs have been identified for the conservation of seabirds in parts of the South Atlantic and assumes a 10 year programme; this is based on preliminary workshop conclusions, and should not be taken as necessarily reflecting the views of the Government of SGSSI or others)</p> <p><b>South Georgia and South Sandwich Islands</b></p> <ul style="list-style-type: none"> <li>Review existing Protected Area (Managed Area) system, re-evaluate existing Protected Areas (and prepare management plans for each), reassess and revise the present Environmentally Sensitive Area (ESA) system with stakeholder consultation. <b>HIGH</b> priority, 1+ person-year</li> <li>Eradicate rats and reindeer at, as a minimum, key white-chinned petrel breeding sites. <b>LOW</b> priority (for ACAP species), high cost (£10-15 million)</li> <li>Continue investigation of potential threats (e.g. impact of visitors and fur seals) to ACAP species at key sites (e.g. Albatross and Prion Islands) and where appropriate, develop management plans. <b>HIGH</b> priority; medium cost (£100,000 per annum) Maintain BAS annual monitoring schemes and decadal all-island counts of selected ACAP species at Bird Island. <b>HIGH</b> priority, £200,000 per annum</li> <li>Maintain (and extend to further species) annual monitoring of breeding numbers and success of wandering albatross, light-mantled sooty albatross, northern giant petrel, southern giant petrel and white-chinned petrels at Albatross and Prion Islands. <b>HIGH</b> priority, £100,000 per annum</li> <li>Count breeding numbers of wandering albatrosses at Annenkov Island every 5 years. <b>MEDIUM</b> priority, £20,000 on assumption of above</li> <li>Photo-survey black-browed and grey-headed albatrosses every 5 years at sites other than Bird Island to confirm population trend. <b>MEDIUM</b> priority, £100,000</li> <li>Census southern giant petrels at the South Sandwich Islands <b>LOW</b> priority; medium cost (c. £100,000).</li> <li>As an adjunct to Albatross and Prion Island monitoring programme, determine population trends and breeding success of white-chinned petrels in areas with and without introduced mammals (rats and reindeer), (e.g. fieldwork at Maiviken and Husvik) every five years. <b>HIGH</b> priority, £15-20,000</li> <li>Take advice on demographic monitoring by French, South African and Australian researchers and consider a full demographic monitoring programme for white-chinned petrels. <b>HIGH</b> priority, low cost (first step only)</li> </ul>	<p>see note at the end of this appendix regarding phasing of activities and resources</p>				<p>£15-20,000</p> <p>£10-15 million</p> <p>£200,000 pa</p> <p>£100,000pa</p> <p>£4,000 pa</p> <p>£25,000 pa</p> <p>£100,000</p> <p>£3-4,000 pa</p> <p>£1,000</p>
<p><b>Design monitoring programmes and management plans</b></p> <p><b>Ongoing activities and management</b></p>	<p>ongoing monitoring and management planning</p> <p>ongoing monitoring and management implementation</p>				



*Government support: UK and UKOT*

<i>Government support: UK and UKOT</i>		<i>Project specific actions (for example)</i>			<i>Cost</i>
<i>Provision of financial support and sources</i>	<i>Action</i>	<i>Development of stakeholder forums - Regional cooperation</i>	<i>UKOT Government/NGO conservation projects</i>		
<i>UK Government support through use of OTEP funding as seed financing</i>	<i>liaison with UKG to support continuation of OTEP and expansion of funding for projects and activities</i>	<i>Regional network</i>			
<i>UK Government support to address identified needs for additional financial funding to support a range of projects and activities</i>		<i>Ongoing activity</i> <ul style="list-style-type: none"><li>• Information exchange</li><li>• Regional training</li></ul> <i>Leading to</i> <ul style="list-style-type: none"><li>• Early detection of threats</li><li>• Enhanced capacity</li></ul>			
<i>UKOT Government support for example through the use of revenues from environmental taxes levied on tourists</i>	<i>liaison between UKOT Governments and NGOs to develop local strategies for managing and funding local initiatives</i>				
<i>Development of stakeholder forums locally to assist UKOT Governments in identifying priority needs such as financial support</i>					
<i>Partnership between UKOT Governments and NGOs in implementing conservation projects and enhancing local community involvement and ownership</i>					
<i>Design monitoring programmes and management plans</i>	<i>ongoing monitoring and management planning</i>				
<i>Ongoing activities and management</i>	<i>ongoing monitoring and management implementation</i>				

*NB: - whilst some of costs will only be incurred once or periodically say every 5 year, there is a need to understand the potential annual cost in order to ensure adequate provision is made on an accruing basis - in all cases it is necessary to evaluate the time required to complete each phase of an activity (e.g. - initial survey/feasibility study, planning activities to be undertaken, implementation, subsequent monitoring and management). This will assist in assessing the timing as well as the size of resource required, as well as how and when it can be undertaken.*



*UKOTCF Wider Caribbean Working Group meeting*



## Topic 8: Environmental Education and the UKOTs

**Session Organisers: Ann Pienkowski (teacher & conservationist) and Dr Juliet Rose (UKOTCF Council, and the Eden Project)**

### Introduction to the session

Education is important - We are living in critical times and facing huge changes.

Environmental Education has a critical role to play in broadening people's understanding of some of the complicated issues we face and encouraging our engagement and participation in the decision making processes.

We know that it is important that environmental education reaches everyone: children, parents, tourists, businesses, governments, everybody. However, this is a vast topic area - so the majority of this session has a schools focus, but we can discuss these other areas after the presentations if people would like to.

We know that there is some great work going on in the Overseas Territories and Crown Dependencies, and we know that Environmental Education is a real strength - so this an opportunity to share experiences and approaches of all this good work.

As part of this session we would like to explore the possibility of developing a shared learning resource to further encourage the exchange of ideas.

Examples of these types of shared resources already exist such as the *Science across the world* project which is a resource for teachers to develop and explore science topics locally and then share their insights globally. Bermuda, Cayman, Falklands and Gibraltar are already signed up to this.

Another example is the *Gardens for Life* project – co-ordinated from the Eden project – a schools gardens initiative running in several different countries, integrated into the national curriculum. It encourages the exchange of materials and ideas through its website

So, with this in mind, we would like to get your feedback on developing a 'portfolio of possibilities' for environmental education in the Overseas Territories and Crown Dependencies – to encourage the dissemination of all our good practice and help us to continue to develop good projects.

We would also like to draw your attention to the posters and other material, with some examples of some of the work by various participants and their colleagues, before turning to the discussion paper, circulated earlier.

We are very pleased that this conference, for the first time, has a group of local students taking part. They gained their sponsored places by demonstrating an interest in, and commitment to, environmental issues. They have already impressed us with their enthusiasm, and their eagerness to learn. (In addition to participating in the conference sessions, in the closing session the student team jointly produced a short presentation of their impression, and also supplied some notes. Some of their impressions of the conference are included at the end of this Topic section.)





# Good Practice for environmental education projects in the UK Overseas Territories: a draft paper for consideration by participants

**Ann Pienkowski** (teacher & conservationist) and **Dr Juliet Rose** (UKOTCF Council, and the Eden Project)

Pienkowski, A. & Rose, J. 2007. Good Practice for environmental education projects in the UK Overseas Territories: a draft paper for consideration by participants. pp 284-289 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

There have been many environmental education projects in the UKOTs, of a high standard. However, their impact and usefulness often remains fairly localised. In this introduction we attempt to summarise key points which make environmental education programmes effective, and discuss issues and challenges. Following these discussions, we hope that future environmental education projects can benefit from experiences gained from previous programmes.

**Ann Pienkowski**, 102 Broadway, Peterborough PE1 4DG, UK.  
[apienkowski@clara.co.uk](mailto:apienkowski@clara.co.uk); **Dr Juliet Rose**, Eden Project, Bodelva, St Austell, Cornwall, UK. [jrose@edenproject.com](mailto:jrose@edenproject.com)

## Introduction

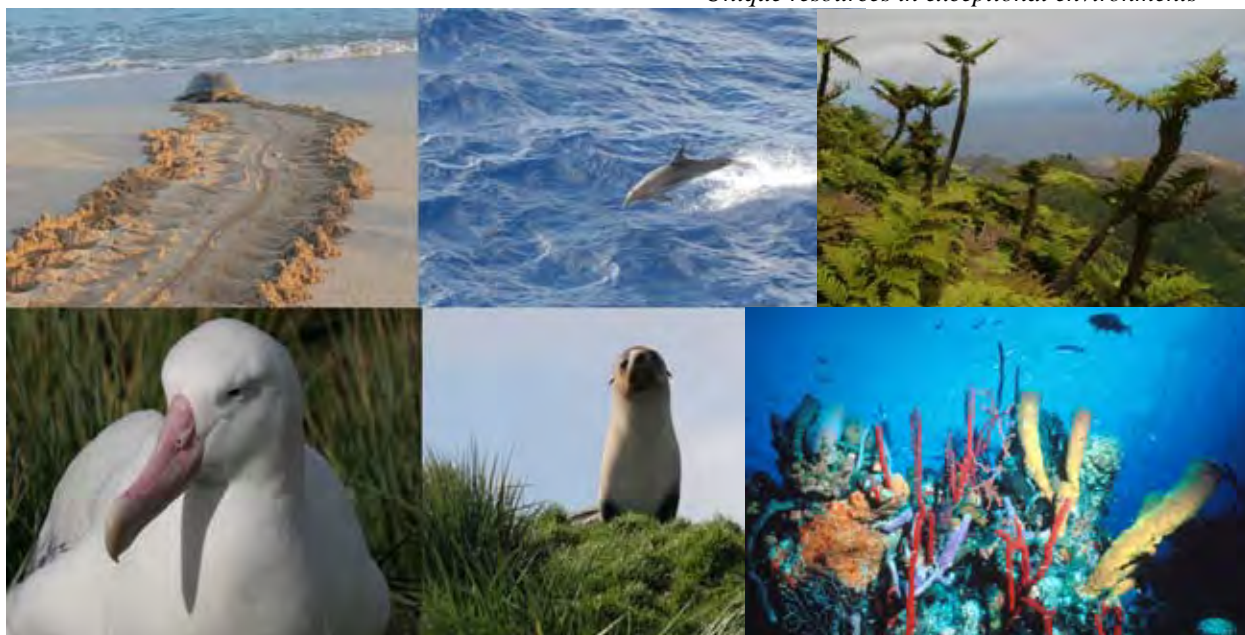
To date the standard of environmental education projects in the UK Overseas Territories has been extremely high. The UK Overseas Territories represent a unique resource for environmental education through their exceptional environmental and cultural heritage. In addition small islands have the potential to act as models for sustainability for a much wider regional and global audience. Environmental education in the UK Overseas Ter-

ritories is key to establishing a positive legacy for the environment within territory but is also critical in raising awareness of the importance of the UK Overseas Territories in UK and elsewhere.

Can we identify good practice approaches to environmental education projects in the UK Overseas Territories?

Can we start to develop a series of case studies

*Unique resources in exceptional environments*





*Endangered and Endemic Species: Bermuda Cahow (above) and Cayman Blue Iguana (below)*



*Cultural heritage in use: Mr Elton Higgs, bush doctor, Turks and Caicos Islands*

Can we increase the impact of UK Overseas Territories environmental education projects?

### **What do we mean by good practice?**

Some initial thoughts:

#### **1) Uses a range of partners**

Definition: teachers, education departments, NGOs, local businesses, tourist offices, local government environment departments, overseas partners.

from each of the overseas territories that demonstrates what we mean by good practice?

Can we use these case studies to help us identify gaps in knowledge, resources, policies and curriculum frameworks?

Why ?

- increase resources,
- offers additional viewpoints,
- spreads the workload.....

Discussion points:

For existing projects:

How were partnerships established?



*Overseas partners: the Bermuda Conference 2003*





*Local community participation: community meeting on environmental project in the Turks and Caicos Islands*



*Access a wide range of resources, natural and human: students visiting caves in the Turks and Caicos Islands*

For future projects:

What types of partnerships should be involved?

Challenges: too many partners can be counter-productive

## **2) Local community participation**

Definition: Parents, community officers, local businesses, local community groups e.g. rotary, church, guides and scouts, kids clubs etc.

Why?

- involving parents can motivate both the children and themselves (changing attitudes)
- involving the local community can increase resources available

Discussion points:

For existing projects:

What type of community engagement took place?

For future projects:

What type of community engagement should take place during the project?

How should this engagement be carried out? At what point of the project should the community become involved?

Challenges: Apathy, lack of awareness .....

## **3) Access to a wide range of resources available**

Definition: Physical resources and media, study sites e.g. resources that make use of the local environment, human and financial.

Why:

- increase motivation of students
- increase understanding
- increase the project's impact

Discussion points:

For existing projects:

What resources were identified which could contribute to the success of the project?

Were any resource constraints identified?

If so, what activities were identified to overcome these?

For future projects:

What types of resources would be needed?

What kind of 'in kind' support is possible?

What resources are available to maintain the project's legacy?

What kind of training and support should be given to establish the project?

Challenges: isolation, capacity – multiple responsibilities...

## **4) Supportive teaching framework**

Definition: curriculum links

Why?

- clear and easily accessible framework allows a wider range and number of people to make use of it

Discussion points:

For existing projects:

Was it felt that curriculum links were important? If not, why? If yes, how were these achieved?

For future projects

Does the existing curriculum create any incentives or disincentives to carrying out these types of projects?

Are new syllabuses needed?



Challenges:

Involving over-stretched education departments and teachers.

### 5) Long-term viability

Definition: Project materials and activities can continue to be used in the long-term

Why?

- Environmental issues are not a short term fix / they span generations

Discussion points:

For existing projects:

How will the outputs of the project be sustained (ie updated ) and continue to be of use in the long term?

For future projects:

What systems need to be considered at the planning stage to ensure that these types of project are viable in the long-term?

Challenges: consistency, changing staff, short-lived resources

### 6) Creativity

Definition: interactive learning, inspirational techniques, harnessing children's enthusiasm for technology.

Why?

- increase understanding, enjoyment and involvement



Discussion points:

For existing projects:

What can be gleaned from other projects that can be used to motivate children and adults?

For future projects:

How can we

be innovative?

### 7) Transferability / generic models and approaches

Definition: Develop models that can be populated with relevant local examples

Why?

- increase the project's impact
- will allow others to build on the project's successes
- raise awareness
- generic issues such as climate change are becoming more important

Discussion points:

For existing projects:

How do you find out what's already happening – eg Web resources that can inform other places e.g. UK education institutions – can this help us establish partnerships (eg US migratory bird project) Are there any examples where project ideas and structures have been used in different situations?

For future projects:

How can we establish and keep networks and links.

Challenges:

- isolation – not reinventing the wheel
- access to information and contacts

### 8) Wide communication and consultation

Definition: disseminating information to a wide audience, influencing decision makers, informing parents and the local community

Why?

- awareness raising
- increase project impacts





- changing attitudes

projects to try to address?

Discussion points:

For example:

For existing projects:

How are public made aware of projects? Who funds this? Which established networks do you use?

- Climate change issues
- Conservation of Biodiversity
- The role of education in helping to implement the Environment Charters
- Sustainable Development
- What else .....?

For future projects:

Should wider public awareness be part of the planning stage?

Are new networks needed? If yes, what is needed and how can this be achieved?

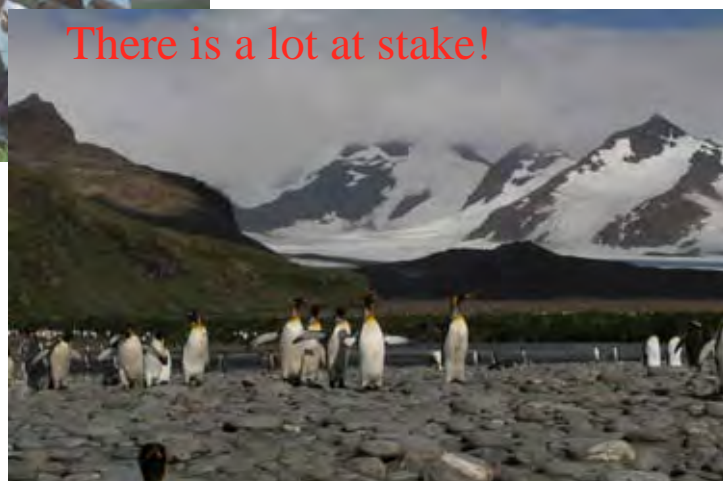
Challenges:

- resources and technology

**Points to consider regarding recommendations for the future**

Can we agree a 'Good Practice for Environmental Education projects in the UK Overseas Territories' paper?

Can we suggest some key issues for future





# British Virgin Islands Environmental CD Atlas and Teaching Resource

**Nancy K. Woodfield-Pascoe, British Virgin Islands National Parks Trust, Mark Hayward, BVI Conservation and Fisheries Department, and Bob McKay, Dougal Thornton Associates**



Woodfield-Pascoe, N.K., Hayward, M. & McKay, B. 2007. British Virgin Islands Environmental CD Atlas and Teaching Resource. pp 289-294 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The BVI is comprised of over 60 islands and cays, yet the majority of the population resides on Tortola, with schools of varying sizes on three of the sister islands: Virgin Gorda, Anegada and Jost Van Dyke. School visits to the sister islands are not included within the curriculum, so many students never visit the other islands in the BVI and as a result have extremely limited knowledge of the BVI's natural environment. Additionally the teaching of geographic components of social sciences and environmental awareness in BVI schools has relied upon the use of regional and international atlases, which have minimal relevance to the BVI.

Developed as a locally implemented initiative, an informational CD Atlas has been created by the NGIS TSC as a resource for schools and the general public to engender a comprehensive understanding of the environments of the BVI and we are now seeking funding to publish and launch this product. By using an interactive atlas, a series of maps, charts, diagrams, tables, photographs, text and internet links, a dynamic web based CD allows students to explore the real world distribution of the environments of the BVI.

**Nancy K. Woodfield-Pascoe**, British Virgin Islands National Parks Trust  
BVI National Parks Trust, P O Box 860, Road Town, Tortola, British Virgin Islands.  
[nkwoodfield@yahoo.com](mailto:nkwoodfield@yahoo.com); **Mark Hayward**, BVI Conservation and Fisheries Department, [mark\\_w\\_hayward@yahoo.com](mailto:mark_w_hayward@yahoo.com); **Bob McKay**, Dougal Thornton Associates, [bob.mckay@dougalthornton.com](mailto:bob.mckay@dougalthornton.com)

## Introduction

The British Virgin Islands (BVI) are comprised of over 60 islands and cays, yet over 80% of the population reside on Tortola, with schools of varying sizes on three of the sister islands: Virgin Gorda, Anegada and Jost Van Dyke. School visits to the sister islands are not included within the curriculum, so many students never visit the other islands in the BVI and as a result have limited knowledge of the BVI's natural environment. Additionally the teaching of geographic components of social sciences and environmental awareness in BVI schools has relied upon the use of regional and international atlases, which have minimal relevance to the BVI which has a total land area of 153.67 km<sup>2</sup> (59 square miles).

Developed as a locally implemented initiative, an informational Environmental Atlas has been

created by the BVI National Parks Trust and the Conservation and Fisheries Department, in collaboration with regional and international scientists as a resource for schools and the general public to engender a comprehensive understanding of the environments of the BVI. By using an interactive



*View of Road Town, Tortola*





*Tropicbird nesting*

atlas, a series of maps, charts, diagrams, tables, photographs, text and internet links, a dynamic web based CD allows students to explore the real world distribution of the environments of the BVI.

### **Context of Atlas Development**

The teaching of environmental issues in BVI schools has thus far relied mainly upon the use of regional and international atlases. Whilst it is very important to understand the relative location of the BVI within this wider context, especially in the case of small island systems that rely upon international sources of revenue and resources, the need for greater awareness and ownership of the local environment are critical for sustainable national development. Therefore the BVI Environmental Atlas project aims to provide factual and current information about the environments of the different islands in a format that will encourage learning and increase overall awareness of the BVI's environments within the classroom of every school throughout the BVI.

Although the atlas was originally created with an environmental focus, the opportunity existed to expand it to include other topics commonly found within a traditional school atlas. Therefore students will now be provided with information on such topics within physical geography such as topography, vegetation, geology, soils, marine habitats, climate, meteorology, biogeography, the environment, in addition to topics within human geography such as cultural, historical, social and infrastructural resources.

The presentation of the BVI Environmental Atlas on a CD and printed format rather than a web-based system evolved as only a few schools within the BVI have access to the Internet. Background



*Hawksbill turtle*

research with BVI students and teachers over a period of four years revealed a great demand for teacher resources to compliment the social studies curriculum which has been recently revised. Support was also sought from the Ministry of Education and Culture, and the Department of Education for the development of the BVI Environmental Atlas.

Primary and secondary level students will be the main users of the BVI Environmental Atlas, and students in class 4, aged 10 years old will instantly benefit as it is during this year that students are first taught BVI social sciences, environmental and historical awareness. Whilst all secondary and tertiary level students will benefit from the BVI Environmental Atlas as a critical reference tool for environmental studies projects that will provide access to information to students throughout the territory, particularly those students and teachers on the sister islands who cannot visit the Government Departments responsible for environmental and cultural issues.

The National Parks Trust and the Department of Conservation and Fisheries are continuously approached by students searching for information on topics ranging from marine resources, flora





*Anegada Horseshoe Reef*

and fauna of the BVI and its cultural resources, yet there are no comprehensive printed materials available at either of these departments that cover all of these topics. It is anticipated that the BVI Environmental Atlas will empower students to independently research projects and be provided with a wide array of technical information which was previously widely dispersed throughout many Government Departments, unpublished reports and unite them in one central location. The BVI Environmental Atlas will more than fill this existing void in educational materials and will present all aspects of the BVI's environmental, social and cultural resources in a user-friendly format. The BVI Environmental Atlas has united all of the National Geographic Information Systems (GIS) data, maps, images, and environmental descriptions into one interactive location that can be easily updated with the addition of new data and information.

Additionally, the BVI Environmental Atlas will be distributed to every journalist within the BVI, every Government Department with linkages to the natural and built environment, every library in the BVI, decision makers, and environmental educators in the UK Overseas Territories in an effort to provide a comprehensive source of reference on the BVI environment and broaden public awareness locally and internationally.

### **Compilation Process**

The BVI National Parks Trust and the Conservation and Fisheries Departments have acquired an extensive image library and information on the BVI's marine and terrestrial resources as a result of the many years of collaborative projects funded by the Darwin Initiative, the Foreign and Commonwealth Office and the Overseas Territories Environment Programme. Consequently the main requirement was the compilation and creation of



text for each section within the atlas and the assessment of images within the existing photo archives and the acquisition of additional photographs as the project evolved. Content for sections was either created by area experts or drafted by the project managers and edited by area experts so that accuracy was ensured. Video clips were also acquired by the project managers, in addition to clips copied with permission from Dr Peter Mumby of Exeter University from his web site entitled Reef Vid which allows for the downloading of free video clips for education benefit ([www.reefvid.org](http://www.reefvid.org)).

An interactive glossary was also created by the project managers that would allow technical terms to be used in context within the relevant sections and expose students to the correct terminology. This would have resulted in the text exceeding the understanding of the primary target audience if a glossary had not been created as a reference tool. Consequently the glossary evolved into a resource containing over two hundred words which have an interactive link to the text so that the user clicks on the word as they are reading the section and the glossary appears.

The project managers' major goal was to ensure that the BVI Environmental Atlas was a very interactive resource that would be easy to use and enjoyed by all ages. This required the development of computer-aided graphics such as Flash animation.

### **Financial Implications**

The primary expenses for the BVI Environmental Atlas include the graphics, computer animation using Flash software, Dream weaver internet software, design and layout of the CD in addition to the design, layout and production of the printed version. The BVI National Parks Trust and the Conservation and Fisheries Department provided





all images, text and maps as in-kind contributions, whilst funding for the production costs were sought from the UK Overseas Territories Environment Programme (OTEP). Prior to the creation of the OTEP fund as a potential source of project funding the BVI Environmental Atlas could not move beyond the compilation phase. The project managers were successful in securing a grant for £40,150.00 which allowed for the production of 5,000 CDs and printed atlases, 1,000 posters, a laptop computer, and a teacher training seminar with 30 teachers to introduce the BVI Environmental Atlas.

### CD Technical Specifications

Due to the nature of the project and the large amount of information, photos, video and audio clips involved, a tool was developed to help manage the data. This 'tool' was the creation of a control panel which was produced as an online application so that multiple people could access it simultaneously. This meant that content for the BVI Environmental Atlas did not need to be emailed backwards and forwards between the project managers. The data from the control panel is then exported ready for use on the CD. The Information Systems Unit of the BVI Gov-

ernment was consulted to determine the screen size and resolution used on the PCs in the public schools. This was determined to be 1024 Pixels wide by 800 pixels high and so the BVI Environmental Atlas was formatted with this in mind.

### Processor Power

The speed at which the animation and video clips work is linked to the manner in which the BVI Environmental Atlas has been programmed, so that it compensates for slower computers by automatically lowering the visual quality, keeping the same content visible. To maximise the usage and access to the BVI Environmental Atlas in CD format it was developed in Macromedia Flash as this is a cross platform which can run on Windows based PCs but also on Apple Macintosh computers.

Due to the strict limitation on storage space on a CD (700mb of raw space), all of the data is formatted to save space, with all video clips and photos being compressed. An alternative was to use a DVD as the storage medium but at the present time, this is far too restrictive and would restrict the number of people able to easily access the BVI Environmental Atlas.





The BVI Environmental Atlas was developed in Macromedia Flash version 8 which is the most recent version of the Flash development tools. Users will not be required to have the “Flash Player” installed on their computer to be able to run the BVI Environmental Atlas as it has been pre-compiled with the atlas.

### Wider Project Significance

The BVI Environmental Atlas is a regional example of how beneficial a national integrated GIS can be, and how it can be utilized for student education of environmental issues. The most important aspect of this project is its collaborative nature, with environmental data and maps freely supplied by a number of government departments, local area experts and scientists for the direct benefit of all educational institutions and the major distributors of public information, the media.

The BVI has already been commended within the region for its extensive GIS database, which allows the production of maps to visually show the current state of the BVI’s environment and the change over time. This is key to the education of students who have no knowledge of the BVI’s historical environmental resources and are only witnesses to its current state. Understanding the changes in the natural environment and viewing these through digital maps and images will ensure that a clear perspective is always maintained. These are important lessons for all small island systems and developing countries with limited financial resources, widely distributed populations, but a wealth of environmental resources.

The Department of Education has been involved in this project since its inception in 2002 ensuring that the BVI Environmental Atlas would compliment the revised social studies curriculum and they will continue to

be a key collaborator, with primary assistance of the organisation of the teacher seminar which aims to introduce teachers to the products and assist them in understanding how they can be used.

The BVI Environmental Atlas is anticipated to become a critical resource for teachers and students, hence the production of CDs and printed versions for individuals that are not computer literate and would prefer a hard copy. The cost limitations of printing restrict the amount of information that can be included in the printed version but it will be a very useful reference tool that is visually appealing with many images, maps and tables.

### Long Term Project Goals

The economy of the BVI is largely dependent upon its natural environment. Unsustainable development practices could lead to environmental catastrophe. The accessibility and comprehensive scope of the environmental information that will be provided in the BVI Environmental Atlas will greatly contribute to the overall teaching and awareness raising of environmental issues throughout the territory as this information will be freely available and in a central location so teachers will not be



*Red mangrove*



*Sunset over Jost Van Dyke*

required to travel unnecessarily from the sister islands in their search for educational resources and they will be more effective in their delivery of the national curriculum. Ultimately, this project will ensure that every child in the BVI is exposed to environmental information that will influence their behavior and attitude towards the development of the BVI as they become adults and the decision makers of the future.

This project will ensure that students are educated about the natural and cultural environments from a young age, which may lead to an increase in the number of students that pursue science based vocations required for effective environmental management. The BVI is currently challenged by a lack of trained BVI Islanders to fill the positions at the Conservation and Fisheries Department and the National Parks Trust, as many high school students are attracted to the high profile offshore finance industry in the BVI. Additionally, the use of GIS and other modern technologies will introduce students to the variety of tools utilised for environmental management.

### **Technical Challenges**

The compilation of the BVI Environmental Atlas required considerable software development and trouble-shooting – which continues. Experience was developed in the process, and there is now effectively a framework which can be used by others wishing to undertake a similar project. Details and contacts are available through BVINPT.

# High Schools Native Plant Nursery Project in the Turks & Caicos Islands

**Ethlyn Gibbs Williams and Bryan Naqqi Manco, Turks and Caicos National Trust**



Gibbs Williams, E. & Manco, B.N. 2007. High Schools Native Plant Nursery Project in the Turks & Caicos Islands. pp 295-296 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)



The Turks & Caicos National Trust Conservation and Education staff collaborated in writing two model proposals for high school projects from which the faculty could select to submit to the Turks & Caicos Islands' (TCI's) Conservation Fund (funded by a tax on tourist accommodation and restaurants). One of the model proposals was for the development of a school herbarium, the other for a school native plant nursery. The National Trust, in cooperation with Clement Howell High School on Providenciales, was awarded a project proposal to create a native plant nursery on the high school grounds for the environmental group in the student biology club. The Turks & Caicos Conservation Fund awarded this grant in May 2006. The project is underway now, and includes the construction of a fenced nursery yard and shade lath with potting benches, purchase of supplies and books, native plant propagation training by National Trust staff and volunteer horticulturists and landscapers, and field trips to find plant materials for propagation, focusing on land scheduled to be cleared for development.

Successes in this programme have included the collaboration of high school faculty (specifically the principal and head science teacher) with National Trust staff, and *pro bono* advice from government engineers, private architects, horticulturists, and landscapers.

Difficulties encountered have mainly been from the prohibitive cost of materials and labour for construction in the Turks & Caicos Islands, and the difficulty of locating a contractor that can devote a team to the project full time due to the high degree of well-funded tourism construction occurring now.

**Ethlyn Gibbs Williams**, Executive Director, & **Bryan Naqqi Manco**, Senior Conservation Officer, Turks and Caicos National Trust, PO Box 540, Butterfield Square, Providenciales, Turks & Caicos Islands. [tc.nattrust@tciway.tc](mailto:tc.nattrust@tciway.tc) & [naqqi@aol.com](mailto:naqqi@aol.com)



*Blackbead*



*Bumbo bush*





*Lantana*



*Orchid*



*Horsepear*



*Joewood*



*Caicos Pine*



*Monkey fiddle  
(left)*



*Gymnonota  
(right)*



*Oxeye and Skipper butterfly*



*Turks & Caicos Heather*



*Smoothpear*

# Jersey Environment Week

**John McGuinness, Deputy Headteacher, Le Rocquier School and Jersey Ecology Fund Trustee**



McGuinness, J. 2007. Jersey Environment Week. pp 297-301 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

‘Developing a long term strategy to win over the hearts and minds of young and old to the importance of environmental education and sustainable living.’

**John McGuinness**, Deputy Headteacher, Le Rocquier School and Jersey Ecology Fund Trustee, Jersey. [jjmcguinness@yahoo.co.uk](mailto:jjmcguinness@yahoo.co.uk)



**A new concept has been born here in Jersey in 2006 that will run and run, but why?**

Question. How do you go about involving 30 schools, over 200 teachers, 5000 students and coordinate 100 school visits in one week in June? Read on.

For long term success one must look at why some projects and initiatives fail to succeed after optimistic starts. Financial constraints, lack of planning or resources and poor communication between interested parties all create a growing number of restraining forces that hinder change, creativity and innovation.

Jersey Environment Week had Guiding principles and clear Targets.

Guiding principles:

Conservation and Protection

Sustainable Development

Community Involvement

Citizenship, looking after our environment

Target 1:

Involve 75% of primary school children in environmental based school visits to sites of local

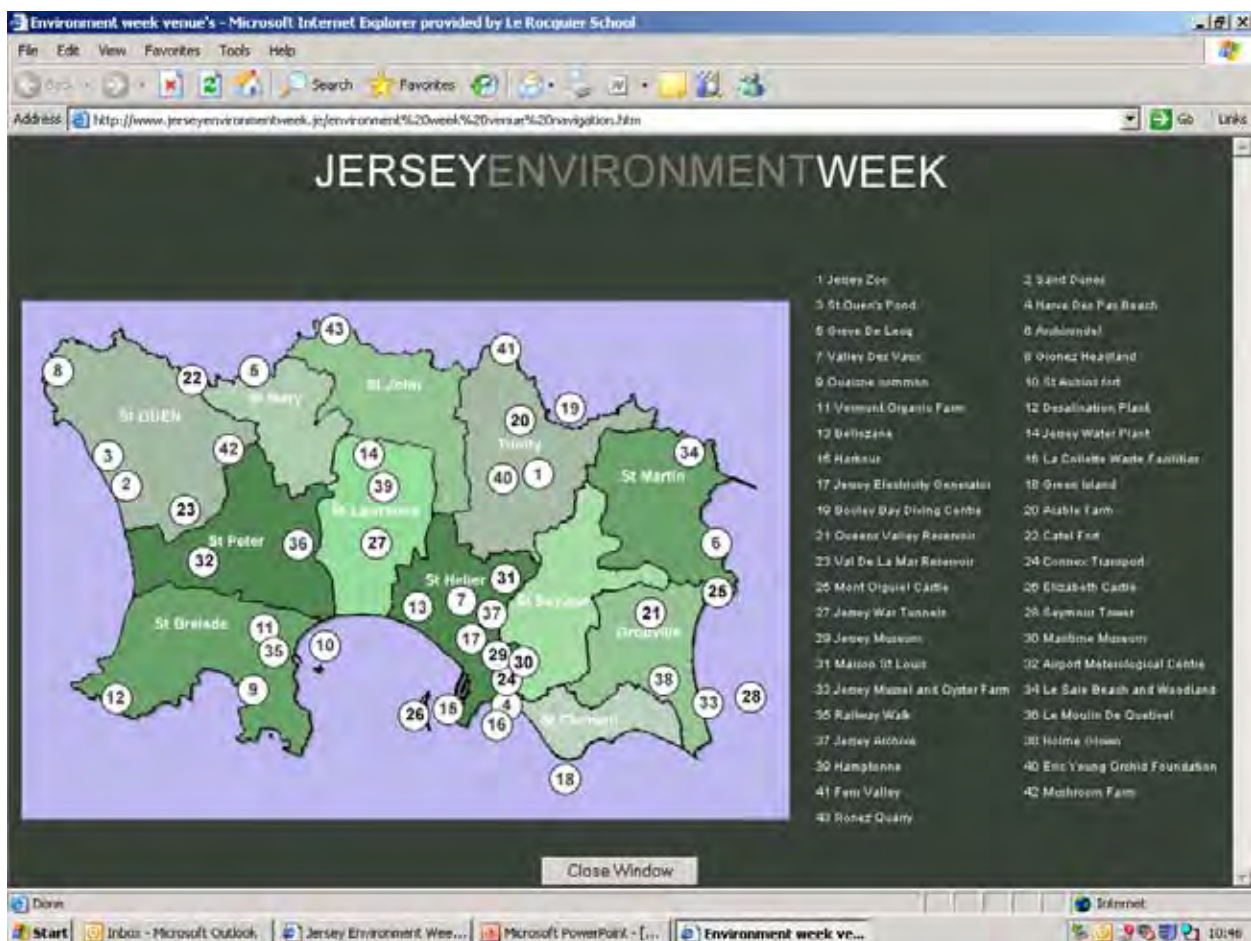
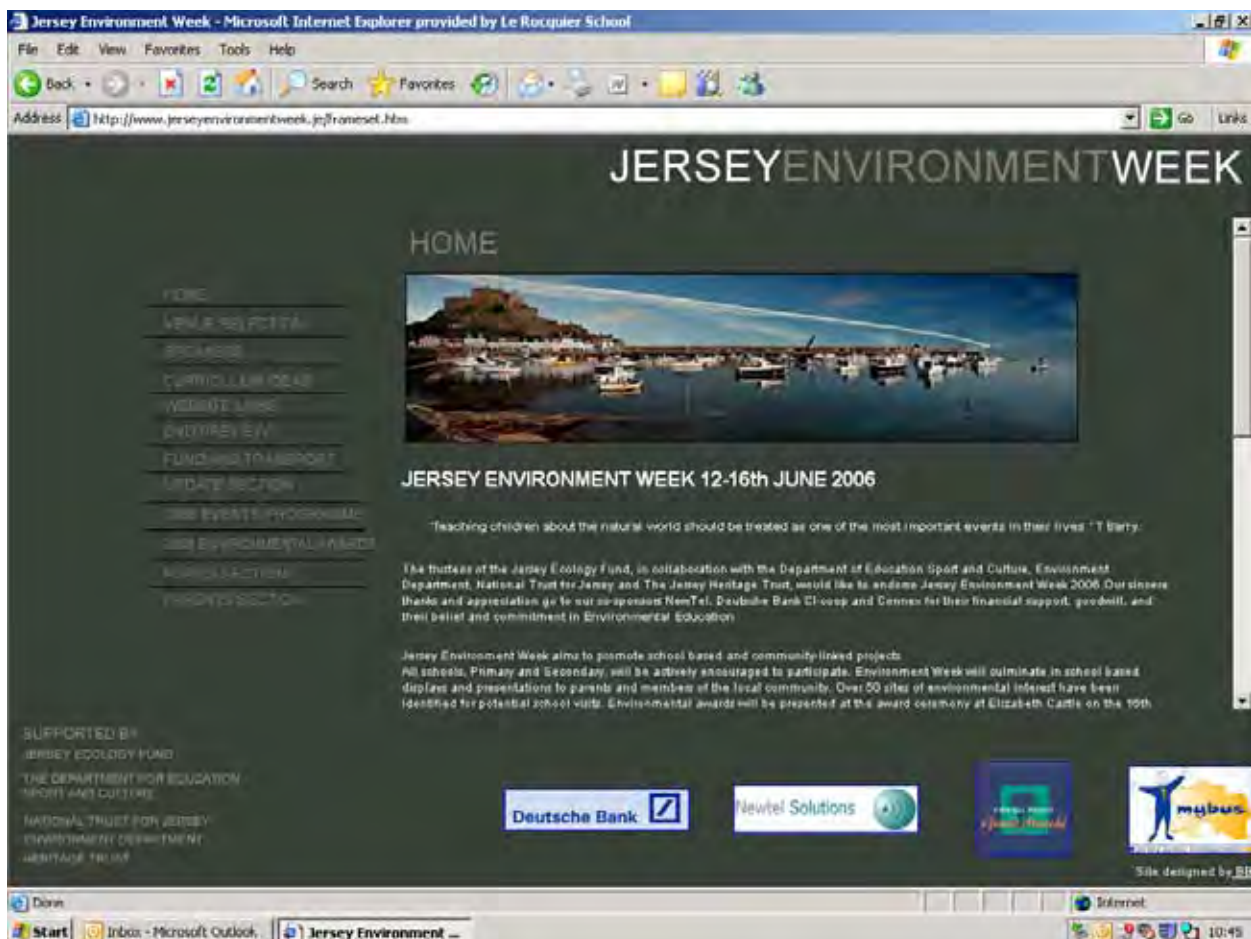
ecological interest

Target 2:

Every school to examine energy / water conser-











vation within their school, and the recycling of materials

#### Target 3:

All schools to establish a productive link with an environmental interest group  
(Island ecology group/ International / National environmental group)

#### Target 4:

Every school to actively promote environment week with parents & local community culminating in a school-based environment week display



Jersey Environment Week has managed to harness the support of interest groups and sites, creativity





sonally consulted and a 'school support package' produced including a short DVD movie for staff meetings, a wide range of useful ideas for environmental projects, useful websites, 50 local venues to visit along with details on funding to support longer term environmental projects and school visits in June. A website was also established to offer schools easy access to information and to improve communication with all partners. [www.jerseyenvironmentweek.je](http://www.jerseyenvironmentweek.je)

Thirty schools were involved in Jersey Environment Week 2006. Seventeen applications were received for funds to support longer-term school-based projects. Nine schools received between them £6000. £4,400 was awarded to six schools

of teachers and imagination of pupils. Put together these made for a successful recipe for environmental education where learning is relevant, meaningful and enjoyable. Jersey Environment Week was built around a clear strategic plan to engage as many schools, teachers and pupils in positive experiences IN, FOR and ABOUT the unique environment of Jersey. Working to a short 6 month time frame funding was secured through private and state partnership to a total of £25,000. This funding was also secured for three consecutive years.

At the start of the initiative, research was undertaken to engage with all partners in the Jersey Environment Week strategy. Headteachers were per-





# Parents urged to visit 'green' website



The website was originally designed by teachers for teachers but has been extended for parents and pupils

PARENTS are being invited to get involved with Jersey Environment Week 2006 by logging onto the internet.

The week of environmental activities from 12 to 16 June will see students building a sensory garden, creating an open air classroom, researching bats and moths and building bird boxes.

But the co-ordinator of Jersey Environment Week, John McGuinness, says children and parents can also get involved outside school hours, and is inviting them to see how by taking a look at the website [www.jerseyenvironmentweek.je](http://www.jerseyenvironmentweek.je). He said: 'The site was originally designed by teachers for teachers to support schools in their preparations for Jersey Environment Week, but it has now been extended with additional sections for pupils and parents.'

## Mass mobilisation

'Islanders can log on to find out more and understand what is planned for next week. We would like the public to support this mass mobilisation of young people. The website offers useful curriculum ideas and guidance on sites to visit as well as the 2006 events programme.'

'There is also a short movie that helps to explain the principles behind this initiative. Young people can access eco-based websites via links to investigate further environmental issues, while parents of young children can gain useful information on new and interesting story books with an environmental message.'



Environment Week co-ordinator John McGuinness

Approximately 180 - 200 teachers were involved in environmental activities.

Nearly 100 (99) environmental school visits were made 12-16th June 2006.

Jersey Environment Week has been extremely well received and well publicised. Evaluations and feedback from all partners has been outstanding. Plans for Jersey Environment Week 2007 are already underway. Next year we hope that 50 schools will take up the challenge involving over 7000 pupils and 300 teachers (a conservative estimate based upon the success of our experiences this year).

*Tell me and I'll forget. Show me, and I may not remember. Involve me, and I'll understand.*

## NEWS

Hayley Schuchell,  
Emma Best, Laura Shaw,  
Gemma Le Gall and  
Angela Dwyer  
report

Photos: JEM/STC

Special week leaves Hautlieu students wanting to build on its success



# Inspired by our world

## NEWS

# Beaulieu pupils turn green for a day

By Diane Simon

A SCHOOL with a blue uniform went green for a day this week in support of the Island's first major Environment Week.

As part of the school's Green Day, children at Beaulieu Primary School were invited not only to wear something green but also to concentrate on environmental issues.

Among the issues targeted was the use of energy with pupils being asked to switch off lights and close down their computers during lessons as a useful lesson in reducing wastage.

## Lunchboxes

Another issue concentrated on was the contents of school lunchboxes and a reduction in school litter. Pupils were asked to reduce the amount of food wrappers their children brought to school. There was a request for consideration to be placed in reusable containers instead of clingfilm, which took time to dispose of or was burnt, adding to the greenhouse gas problem.

During Environment Week, organised by Le Rocquier deputy head John McGuinness, thousands of primary and secondary schools are raising important environmental issues and working on related projects.

As a highlight of the week, six schools are due to present conservation awards on Friday for showing good practice. They will also receive cash prizes to be invested in their own environmental work.



Being green... Beaulieu pupils with the rubbish they have collected in an effort to reduce school litter (Photo: JEM/STC/STC)

showing best practice.

5000 pupils were actively involved in environmental projects 12-16th June.

This is Jersey - News - News Archive Search

Page 1 of 2



Saturdays June 17, 2006

NEWS | SPORT | CLASSIFIEDS | LIVING IN JERSEY | OUT & ABOUT | ISLAND IMAGES | SITE HIGHLIGHTS

Home

Current News

Current Business

CE Share Prices

News Archive

Comment

Letters

Business Brief

Business Review

Funds Review

Finance Review

Wealth Management

Local Links

This is Jersey

advertisements managed by the Giffon Group

News & Sport from the

The Island becomes one big classroom

By Diane Simon

THOUSANDS of Island students will be visiting some of the Island's most important natural and man-made sites as part of Jersey's first Environment Week in June.

Included in the outdoor opportunities on offer, will be the chance to sleep overnight at Elizabeth Castle, study wildlife around St Ouen's Pond, go abseiling or kayaking, visit Crabbe adventure centre, or tour a Jersey royal farm. As part of the event, schools will be able to compete for £4,500-worth of prizes for organising the most innovative environmental campaigns either in their own grounds or within the community. It will be the biggest mobilisation of schoolchildren to ever take place in Jersey at one time in the name of environmental education. Co-ordinated by a panel led by Le Rocquier deputy head John McGuinness, the event has been funded by Education Sport and Culture, the Ecology Fund and sponsors Deutsche Bank, Hewlett and Connex. The



# Environmental Education Programme (including education packs) for the Falkland Islands and Ascension Island

**Ali Liddle & Grant Munro, Falklands Conservation and Tara Pelembe, Conservation Centre, Ascension Island**

Liddle, A., Munro, G. & Pelembe, T. 2007. Environmental Education Programme (including education packs) for the Falkland Islands and Ascension Island. pp 302-309 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

There are four areas covered during the short presentation:

1. Reasons for the project. This will introduce the rationale behind the project and why it was felt to be vital for the schools in the Falkland Islands and Ascension Island to have access to locally focused environmental education resources.
2. Main objectives of the project. The main objectives were set out in the OTEP application and subsequent work plan. This will just highlight the main objectives of the environmental education project.
3. Main outputs of the project. Again these outputs were highlighted in the OTEP application to give focus and direction to the project and ensure there was a relevant end-product.
4. The project so far. This will outline the work completed during the first 12 months of the project and other areas for future development.

**Ali Liddle & Grant Munro**, Falklands Conservation, P O Box 26, Stanley F1QQ 1ZZ, Falkland Islands. [grant.munro@conservation.org.fk](mailto:grant.munro@conservation.org.fk)  
[ali.liddle@conservation.org.fk](mailto:ali.liddle@conservation.org.fk); **Tara Pelembe**, Ascension Island Government Conservation Department, Georgetown ASCN 1ZZ, Ascension Island.  
[tara.pelembe@ascension.gov.ac](mailto:tara.pelembe@ascension.gov.ac)

## Introduction

I am going to begin by giving a short introduction to the Environmental Education Programme with Falklands Conservation.



The project is just part of a larger project entitled Community Environmental Awareness and Citizen Science Programme that is currently underway in the Falkland Islands. The educational side of things is an 18 month joint project run between Falklands

Conservation and the Conservation Department on Ascension Island and is headed by Ali Liddle, a Primary School teacher based in the Falkland Islands.

Funding for the project has been received from OTEP (Overseas Territories Environment Programme), FIG (Falkland Islands Government), Edinburgh Zoo and Falklands Conservation.

I will be covering four main areas during this short presentation:

1. Reasons for the project
2. Main objectives of the project
3. Main outputs of the project
4. The project so far.

## Reasons for the project

“Everybody knows that children would rather be out than in.” Quote from Growing Schools website. This quote applies to adults as well as children! First-hand experiences of the natural



environment are the most valuable tool available to teachers to ensure that children develop their knowledge and understanding of the world around them. The main reason for developing environmental education resources for the schools in the Falkland Islands and on Ascension Island was to give a local focus to some areas of the curriculum being taught. Students in both locations follow the National Curriculum for England and Wales. As a result, the teaching focus and commercially available teaching resources are all UK-based. It was hoped that by producing material with a local focus students would develop a greater understanding of the environment around them and the species living there, whilst still fulfilling the requirements of the National Curriculum.

## **Main objectives of the project**

The main objectives stated in the project are to:

- a. Provide environmental teaching resources for use in Falkland Island and Ascension Island schools;
- b. Provide environmental education support and opportunities for hands on involvement in conservation activities for all ages and all sectors of the community.

## **Main outputs of the project**

The main outputs of the project are:

- a. Environmental resources provided for Falkland Islands and Ascension Island teachers and youth group leaders;
- b. Children informed of and interested in the environment around them, developing a lifelong respect and responsibility for their local natural heritage;
- c. A conservation group for 13 – 16 year olds tackling practical conservation issues and assisting with basic scientific research.

## **The project so far**

The project so far has resulted in a number of ‘teaching packs’ to be used in school. These teaching packs are based on some of the units of work set out in the QCA National Curriculum for Science and Geography.

11 Science units have been targeted ranging from a Year 2 (age 6-7 years) unit entitled Plants and Animals in the Local Environment to a Year 9 (age 13-14 years) unit covering aspects of Inheritance and Selection.

In Geography so far there have been 3 units resourced and completed in the Primary curriculum and 5 units of work of the Secondary curriculum are currently being developed.

The ‘teaching packs’ for the Primary sector include things such as:

- a. Lesson plans for teachers based on the learning objectives set out in the QCA units of work;
- b. Details of activities to complete both in the classroom and out ‘in the field’;
- c. Locally based teaching resources and materials to enable teachers to complete successfully the activities and deliver the lessons and so fulfil the requirements of the National Curriculum. Resources include ID fact sheets for local species, which can be used in a variety of activities throughout the age range, posters and worksheets to name but a few.
- d. Packs have been produced in such a way as to ensure that there are enough activity packs for a class of 25 – 30 students to work in small groups to complete the tasks. This means that there is minimal teacher preparation time required for the sessions.

In the secondary sector the packs are a slightly different format. The subject teachers involved have been provided with a range of resources that could be used to achieve the learning objectives set out in the QCA documents but there is a little more flexibility in order for them to plan their own specific lessons and activities. This is rather like giving them the tools but with the freedom to use them as they wish. Things, such as these ID fact-sheets (see two examples on following page), can again be used throughout the secondary age range in a variety of activities.

Identification fact sheets form the basis for many different activities and have been completed for birds, mammals, plants, invertebrates and marine species. They include details such as a description, breeding information and habitat information. Young children can complete simple sorting activities such as grouping species according to their features or the habitat in which they live. They can be used to build simple food chains or more



### King Penguin.

*Aptennodytes patagonicus*



**Description:** Black head, blue-grey back, white chest, black tail. Distinctive orange ear patch fading to yellow on chest. Brown eyes, black legs. Chicks have long, thick, brown down and a black bill.

**Habitat:** Main colony is at Volunteer Point on the North coast. Colonies found near sandy beaches on coastal green habitats. Often seen in Gentoo colonies.

**Height/size:** Maximum height 95 cm. Maximum weight 14kg.

**Food:** Fish and krill.

**Predators:** Southern Sea Lion, Orca (Killer Whales)

**Breeding Information:** Breeds in 2 out of every 3 years. Eggs are laid between November and April. The large white egg is incubated on the adult's feet under a brood pouch. Incubation period is 30-40 days.

**Environmental Threats:** Marine debris, pollution and human disturbance.

complicated food webs. Older students can use the fact sheets for extended classification of families and sub-species.

These have been completed for species in both the Falkland Islands and on Ascension Island (example



### Commerson's Dolphin.

*Cephalorhynchus commersonii*

"Puffing Pig"



**Description:** Distinctive black and white colouration. Black head, dorsal fin, flippers and tail. White flanks and belly. Rounded flippers and dorsal fin.

**Length:** Maximum length 1.7m.

**Habitat:** Fairly common around Falkland Island coastal areas particularly in sheltered bays, inlets and areas with kelp beds.

**Food:** Squid, fish, small crustaceans and krill.

**Predators:** Orcas (Killer Whales) parasites. Dolphins are particularly susceptible to parasites.

**Behaviour:** A relatively fast swimmer occurring in pods of 3-9 animals although pods of 30+ animals have been seen at times. Quite acrobatic and can be seen breaching, bow riding boats and surfing waves.

**Environmental Threats:** Commercial fishing - dolphins are often caught in fishing nets. They are also hunted for use as bait in crab traps. Marine debris and pollution are also threats.

Photo by Paola Palavecino





## Sooty Tern. *Sterna fuscata*

Zone 1.

"Wideawake Tern"

Population 190,000  
(Ashmole 2000)

**Description:** Black and white sea bird. Black on top and white underneath with a long forked tail. Distinctive "Wideawake" call.

**Size:** Body Length: 45cm. Wingspan: 90cm.

**Habitat:** Found around all coastal areas of Ascension Island but the main colonies or "fairs" are found at Mars Bay and Waterside.

**Food:** Small flying fish.

**Predators:** Frigatebirds will take chicks and feral cats also used to be a problem prior to their eradication. Myna birds take eggs.

**Breeding Information:** Breeding is on a 10 month cycle as their food source is available all year round. Lays a single white egg, with brown speckles, in a scrape nest or on bare rock. Nests found amongst volcanic rocks near the south coast. Incubation period 28 days. Chick fledging 35-65 days depending upon food supply.

**Environmental Issues:** Due to the large numbers of birds breeding together in the colonies Feral Cats didn't pose quite the same threat to the overall population of the Sooty Terns but the eradication programme should help numbers increase.

Photo Ali Liddle

for the latter above).

Photo posters have been produced to use as teach-

ing aids and as a stimulus for learning. For example the posters (below and next page) show the different habitats in the Falkland Islands and on



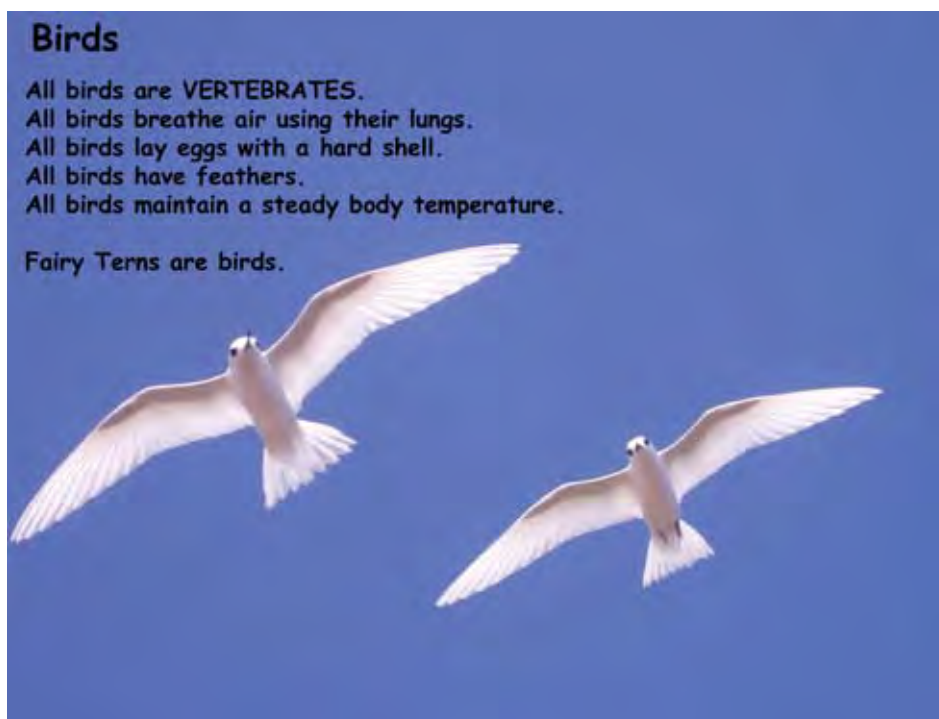




Ascension Island and the most common species you would expect to find in those habitats.

These habitat posters have been completed for both the Falkland Islands and Ascension Island. Children can see the habitat location and quickly identify the most common species they are likely to find there.

Posters (example below) showing classification of species using species found locally have been designed so that students can focus on the local species rather than those found in the UK. Badgers, squirrels and foxes living in British woodland areas are great but not entirely relevant at times!



The posters have been completed to include mammals (next page), reptiles and insects etc.

Other resources that have been produced include photos guides to species in various local areas, posters, photo-copiable worksheets, jigsaw puzzles, and slide show presentations with accompanying notes. For students in Year 6 studying a unit entitled Investigating Coasts there are posters showing local examples of coastal features and an

### Mammals

All mammals are VERTEBRATES.  
All mammals breathe air using their lungs.  
All mammals give birth to live young.  
All mammals feed their young with milk.  
All mammals have body hair or fur.  
All mammals maintain a steady body temperature.

Sea Lions are mammals.



explanation of their formation rather than using examples from the UK. Students on Ascension Island now have posters showing local volcanic rock formations to support the Year 3 unit studying Rocks and Soils and a Year 7 Geography unit entitled A Restless Earth. There are many more areas of the curriculum now supported in this way.

There are photo guides to the birds and plants you might expect to find in some of the specific locations to be visited by the students. These field studies are supported by photocopyable worksheet resources that can be used in the classroom as a follow-up to the fieldwork.

Photo posters have been produced to use as teaching aids and as a stimulus for learning. For example posters showing explanations about the process of plant reproduction and photosynthesis have been designed using photographs of plants found locally.

Other resources include slide shows available on CD, along with supporting notes showing some of the most common animals and plants found in the local environment. Students will now have access to a photo database of locally found animals and plants to use in a variety of projects.

Jigsaw puzzles depicting local wildlife and

scenes have been printed and are in the primary schools and Camp Education. These are available as 30, 60, and 150 piece puzzles and are designed to support the units of work to be completed within the relevant age groups.

The pictures on the following pages show children working in the outdoors – the hands on approach

Since the project has been running, classes at the Infant and Junior School in the Falkland Islands have been out on a number of new field trips in their local area. Reception class, age 4 and 5 went pond dipping (see picture at top of next page) and collected a variety of freshwater invertebrates







when they completed a topic about water. They used fact sheets and guides to identify the species they found.



Year 2, age 6 and 7, carried out a survey (above) of plants and animals in two contrasting local environments, which was then followed up in the classroom with a number of different activities using the ID cards and Habitat Posters.



Year 4, age 8 and 9, have to complete a unit of work entitled Habitats so they studied and recorded the species found in coastal tussock habitat (above)

and along the nearby shoreline and compared this to what they found in an inland Heathland area.



Year 6, age 10 and 11, as part of a study Investigating Coasts (above) recorded the coastal features of Gypsy Cove and then in pairs produced Walking Guides to the area containing directions, maps and photos they had taken themselves. They identified some of the coastal features to be seen, highlighted where they could be viewed from and wrote explanations as to how they had been formed.



On Ascension Island members of the youth group the Ascension Explorers went on a trip to see the Sooty Terns while they were breeding (above).





*"They are our future"*

The visit to the Sooty Tern colony was then followed by a slide show about Falkland Islands wildlife (picture at bottom of previous page). This gave many children an insight into the species found living and breeding in a very different environment.

*"They are our future"*

To conclude it is hoped that the main outcome of the project will be that all children in both the Falkland Islands and on Ascension Island will have the opportunity to develop a valuable understanding about their local environment, the wildlife they share it with and the relationships involved. It is hoped that as they grow up this knowledge and understanding will develop into a responsibility for their islands, which should ensure that the future of the environment is in safe hands.



# Recommendations from the Environmental Education Session

**Lynda Varlack, Ann Pienkowski and Juliet Rose**



Varlack, L., Pienkowski, A. & Rose, J. 2007. Recommendations from the Environmental Education Session. pp 310-311 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

**Lynda Varlack**, Conservation & Fisheries Dept., Government of the BVI, P O Box 3323, Road Town, Tortola, British Virgin Islands. [lvarlack@gov.vg](mailto:lvarlack@gov.vg);

**Ann Pienkowski**, 102 Broadway, Peterborough PE1 4DG, UK.  
[apienkowski@clara.co.uk](mailto:apienkowski@clara.co.uk);

**Dr Juliet Rose**, Eden Project, Bodelva, St Austell, Cornwall, UK.  
[jrose@edenproject.com](mailto:jrose@edenproject.com)



## Discussion following presentations in the Environmental Education Session

The following points were made in discussion following the presentations, which resulted in the four recommendations given below.

There was agreement for a good practice structure for environmental education projects and initiatives.

A mechanism was clearly needed to enable sharing of resources, and exchange of ideas and approaches, more easily. In addition to locally based and developed resources, there was now a number of very good websites offering environmental education ideas and resources. Making people aware of these would be a valuable way of supporting educators delivering environmental education programmes. Some examples given were 'Science across the world', 'Gardens for life', 'Roots and shoots programme – Jane Goodall', but there are many more which could be made good use of by busy teachers.

Education programmes should be developed which made use of local environments. This would be helped if local syllabuses supported this, or could be amended to facilitate this. This would require targeting of government education departments, principals, and teachers, with appropriate professional development. These were most effective if local educators were involved in creating locally applicable materials using generic models. A good example was the education packs developed for Falkland and Ascension Islands, where a clear curriculum framework could be populated with local materials. Another key point here is that local studies within a clear curriculum framework, especially one based on the National Curriculum for England and Wales, could be assessed and graded fairly in the UK. It was often easier to take material developed elsewhere and adapt it to local needs. It was also considered important that correct terminology should be used throughout, with appropriate glossaries to make the material understandable and useable for a wide audience. This had been a key point in the development of the BVI CD Atlas.

It was important for the built environment to be included in locally-based environmental education. There were several good examples to demonstrate this, including the St Helena National Trust education packs about local history, developed from source material found in the archives. These are now available in electronic form. These were valuable resources for cross-curricular work, as was the BVI CD Atlas. It was important that environmental education encouraged wider understanding of the



whole environment, and its place in a global sense.

Wider public awareness and understanding could be fostered using stamp series, with supplementary interpretative information, such as the good example from Cayman which celebrated local species. This had enabled direct targeting of specific audiences, and good community participation.

Other suggestions for how a wider global perspective could be obtained for the value of small, often quite isolated, UKOTs were the exchange of postcards, artefacts, photos, messages etc (as in the Postcards around the World project). There were also networking programmes involving linking schools, for example along the migratory routes of certain species of migratory birds. This contribution developed into the idea of establishing an on-line discussion forum to enable communication of issues and solutions. Another idea was the integrating of current science research projects into the education curriculum, for example satellite tracking programmes of turtles, and other animals. This would help raise awareness also of global diversity, similarities and differences.

A key point to think about addressing was educating students inside the UK about the UKOTs. Royal Botanic Gardens Kew and the Eden Project are both trying to raise awareness of the UKOTs with displays from each of the UKOTs. So far these had been done for BVI and St Helena. There should be continuing efforts to develop links and exhibits with UK NGOs to raise awareness of UKOTs, e.g. at zoos in the UK. Geography has been identified as the worst-taught subject in the UK for 12-14 year-olds, so developing a curriculum based on the UKOTs would actually be very beneficial. There was a suggestion that funding (e.g. OTEP) should be sought for the development of such a module.

The discussion highlighted also the important point of raising political awareness of environmental issues, especially with reference to good governance and the decision-making process. Governments and developers need to understand that the environment on which their tourism development depends has to be protected and managed sustainably. Linking with this, environmental education should be focused on a broad audience, including tourists and local businesses. Environmental education should also be about cultural identity, language and global citizenship. Therefore, there was a need to develop information packs and leaflets for this wider audience. The Education and Public Awareness

Raising commitment in the Environment Charters was also noted, as a mechanism to be used to increase funding and resources for environmental education. It was suggested that every UKOT and CD should have an environmental education co-ordinator, as part of the education department.

### **Recommendations from the Environmental Education Session**

1. Develop a mechanism for being able to share resources and exchange ideas and approaches more easily. Establish an education section on the UKOTCF website which will provide reciprocal links with territories and other global resources and education sites. This will grow over time.
2. Continue to develop environmentally-focused academic programmes at all levels for students and teachers that apply emerging technologies, use local environments within a global context, and foster world-wide networking and professional development.
3. Raise political awareness and commitment towards solving environmental issues through good governance and accountability and transparency in the decision making process.
4. Through environmental education, raise public awareness, thus empowering communities and stakeholders to influence the decision making processes.

# Student impressions of the Conference

**Alain Baudains, Samantha Cropper, Katie Mason, Gemma Parlett, Sophie Pickup, Alex Pinel, Piers Sangan, Aimée Vibert and Emma Voak**

Voak, E., Vibert, A.L., Sangan, P.R., Pinel, A.H., Pickup, S.E., Parlett, G., Mason, K.L., Cropper, S. & Baudains, A. 2007. Student impressions of the Conference. pp 312-316 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Some of the views on the conference from the local students who participated.

**Alain Baudains, Alexander Helier Pinel & Piers Robert Sangan**, Victoria College, Jersey; **Samantha Cropper, Katie Louise Mason, Sophie Emma Pickup & Emma Voak**, Jersey College for Girls, Jersey; **Gemma Parlett**, Open University student, Jersey; **Aimée Louise Vibert**, Beaulieu Convent School, Jersey.

## Student Speeches

*In the closing session at the main conference venue, the nine members of the student team worked together to put together their first impressions. All spoke briefly, and those parts available from notes from several of the students are given below.*

Out of the sessions we attended over the conference we especially enjoyed Sunday's walk – wet feet and tired legs just added to the experience. Although already being familiar with Jersey's Ramsar site I learnt a great deal more and now fully appreciate this amazing ecosystem that lies right on our doorstep.

We tried our best to understand various technical terms and were surprised at how much of the conference we could be a part of, and grasp.

The invasive species session I found particularly interesting – especially the Cayman Island case study on Hurricane Ivan, as I am currently studying hurricanes such as this in Geography.

The session on “Good Practice for Environmental Education projects in the UK Overseas Territories” was also extremely relevant to all the students here today. When going back into school for various lessons over the past few days we found both teachers and students showing great interest in what we had learned. We would also like to see if it is possible to have some sort of programme about the UK Overseas Territories so we can better understand them.

Overall we have all learnt a great deal about biodiversity across the Overseas Territories. As the first



*Samantha, Piers, Emma, Katie, Sophie, Alex, Alain, Aimée and (inset) Gemma*

set of students attending the Conference, we all felt that it was a very worthwhile experience, and we recommend that in years to come students from other Territories would be able to have the same opportunity.

We are looking forward to this afternoon's visit to Durrell and anyone who has not had the chance to visit our Island's Wildlife Conservation Trust is in for a great treat.

This has been a new experience for me, it has been highly informative and educational. The working group session this morning has 'enlightened' me on possible work experience possibilities. Covering invasive species again, the knowledge I have taken in is incredible. Before this conference, I was not aware that invasive alien species was such an issue.

St Helena has really struck a place with me in this conference. I have met new people and made new friends. I have spoken to Cathy Hopkins, about possible future involvement.

I have felt the past few days I have been pounded with new information which has been readily taken in. All I have left to say really is, thank you.

Finally, we hope that you have enjoyed your time here in our beautiful island of Jersey, and have a safe return home.

*As well as contributing to the above speeches, several of the students also supplied, after the conference, short notes of their impressions. These are given below.*

### **Emma Voak**

Having not attended any conference before I had images of it being very formal and was quite apprehensive about what it would be like. As soon as I arrived on the Sunday morning however, I gained a very warm welcome realised that I was not only going to learn a great deal, but that it was also going to be a very sociable few days!

The walk was amazing and, although being a Jersey resident, I had never experienced it before; so this was a great treat. I also started to appreciate how large our tidal movements are in comparison to the rest of the world, as others on the conference seemed shocked by the speed and distance that the sea travelled every day, something that seemed normal to me here in Jersey. Being a student I

think I can speak for all of us by saying how much we enjoyed the walk. Anything that can combine learning with being outdoors and active is definitely something we enjoy, and the walk did just this. We all slept well that evening!

On Monday I attended the "Marine, including fisheries" Session. I found the various strategies used to cut down on the numbers of Albatrosses from the Falklands and elsewhere killed in the Southern Ocean very interesting, and it was good to see how deaths had declined over the past few years.

"Dealing with invasive species" was another very interesting session, and I found the information on hurricane Ivan and its impacts on invasive species in the Cayman Islands particularly useful as I am currently studying hurricanes as part of my A2 Geography course.

The education session was particularly relevant to all the students attending the conference - we look forward to perhaps using the BVI's CD Atlas as I believe a copy is being sent to one of our schools. It sounded a great idea and would be a really useful tool in any UKOT for students, to allow them to learn more about the island that they live in.

Overall I had a really interesting and stimulating time on the conference; meeting and chatting with people from places across the globe, who knew so much about the conservation issues that their islands face was an amazing opportunity. The visit to Durrell was a great way to end my time spent on the conference. It was a wonderful few days and I am extremely glad that I applied to attend; again a big thank you to everyone for making us feel so welcome and for making the student group feel such an integral part of the UKOTCF "Biodiversity that Matters" Conference 2006.

### **Aimée Vibert**

I have to admit that, when I applied to attend the Conference, I knew very little about the Overseas Territories. They were all places I'd heard about but I had a very limited idea about their vast biodiversity. However, in the four days I sat in on sessions, I began to appreciate what these islands have to offer and I have nothing but admiration for the people working to preserve these islands.

I particularly enjoyed the walk on our Ramsar site because, even though it is somewhere I have been many times before, it is always changing and



the company really put a different perspective on it. To me, the vast tidal movement we experience twice a day is normal, but the walk reminded me how exclusive it really is!

On Monday I experienced a good dose of acronyms. Again, I was aware of the need for Environmental Charters and agreements, but knew very little about how they worked. I gained a deeper understanding from these sessions, even though some of it went right over my head!

The sessions relating to education had the greatest impact on me. They struck a cord because they are so relevant to people of my age. Education is fundamental to any conservation effort and I was privileged to be able to take part in the discussions on the formation of the Europe Territories Working Group.

I really enjoyed my time at the conference and it has left me with a lot to think about, now and for my future career.

### **Piers Sangan**

I must once again offer my thanks for being able to attend such a marvellous occasion and I am really glad that you allowed the students of Jersey to attend the conference.

The first evening was very interesting as the Bailiff of Jersey gave us a brief history of Jersey (some that I didn't know and I live in Jersey) and welcomed the conference to Jersey.

Sunday morning we gathered at the hotel before starting out on our long (cold) trek out to one of Jersey's Ramsar sites. Led by our Island's expert guide, Andrew Syvret, we first hiked across the rocky landscape to Icho tower where we enjoyed a superb packed lunch. The less brave turned back to the safety of shore at this point, as the more adventurous people carried on to Seymour tower, enjoying the many rock pools left behind in the receding tidal wake. When we finally arrived back at land most people did the most natural thing after a long walk, went to the pub!

For me the most interesting part of the conference was the 'Environmental Education' section on the Tuesday afternoon. Here we listened to ways in which some of the territories are trying to educate people about the environment. I especially enjoyed listening to and seeing the program which the BVI

has developed. I think that it would be fantastic if all of the territories produced a similar program to the BVI to make it a lot easier for people to access the information in the UK and in the Channel Islands.

I hope that all of your different programmes for helping, educating and protecting the environment work well, such as the St Helena airport which we had described to us during the terrestrial section of the conference on the Monday.

If I am to sum up the conference in one word it would be: 'FANTASTIC'. This conference has opened my eyes to all of the problems faced in developing a strategy to conserve our environment. I do think that it was a brilliant idea to get students involved and I hope you will allow students to attend your next conference.

Thank you once again for this wonderful experience.

### **Gemma Parlett**

Thank you very much again for allocating me a place on the 'Biodiversity that matters' conference; I truly appreciate it.

I have been very busy since the conference as I have started my 'Discovering Science' Open University course and it is taking up all of my spare time.

I enjoyed the 'Conservation of the built Heritage in the Overseas Territory' talk because I had never really known about the wonderful work that is done all over the world to restore all of those beautiful buildings.

I thoroughly enjoyed 'A walk on the seabed: Jersey's first Ramsar site' with Andy Syvret. Although I had completed the two-tower walk in the past it is always interesting to do it again, to see whether Andrew had added anything new into his talk or to see if there were any parts I missed last time.

The walk also gave me time to wonder around talking to different people, finding out about where they live, work, studied etc and, in turn, people asked me questions and offered suggestions and support of my future plans, which was lovely. I also loved watching the reactions of other UKO-

TCF members, who hadn't visited Jersey before, to sea creatures they found on the beach, .

The 'Environmental Education and the UKOTs' session was very interesting. I particularly enjoyed hearing the different speakers and the variety of worldwide work they are all doing. They are obviously all passionate about the wonderful work they do, which I found inspiring.

I just managed to catch 'Examples of Durrell's work in the UK Overseas Territories', which I also enjoyed and found very interesting. It is a shame that I live on Island with only one 'zoo' and there is so much great work that they are doing, yet it is not known Island-wide.

Thank you again for inviting me to join you for the closing dinner; it was lovely and also gave me a chance to meet and talk with some more people from different countries.

I found the whole conference fascinating and I was just sorry I had to work and missed out on many of the other interesting sessions/talks. Thank you again Ann and Mike. I will continue to follow the work of UKOTCF and hopefully, when I have finished my studies, I will be able to attend another of your fascinating conferences.

### **Katie Mason**

As a student coming to the conference early on a Sunday morning I have to say I was a little nervous. However, all of these initial nerves were eliminated by the warm welcome received from everyone who was taking part in the conference.

My most memorable experience was the walk through Jersey's sea-bed to Seymour Tower. It was a great way to start the conference as it allowed everyone to get to know everyone. It was on this walk I met some friends from the British Virgin Islands of who I am still in touch with after the conference has closed.

During the whole experience I learnt a lot not only about current environmental issues and the world around me but also learnt vital communication and people skills.

I found the discussions on dealing with alien invasive species particularly interesting as it was something I could relate to my Geography A Level.

However, all the knowledge gained has proved useful, not only in Geography but also in team-building exercises and my other academic studies at school and I hope I will now be able to take these experiences with me in life after my studies into the workplace. Whilst broadening my experiences on this conference I have learnt a lot about islands I didn't even know existed!

Another discussion I enjoyed was the 'Education and raising awareness of conservation issues in the UKOT's' and we are currently looking at school to put into action some of the ideas we gained from this discussion, such as Jersey's own Student Forum and a Jersey Encyclopaedia.

In my opinion, as one of the lucky first students to have been invited to the conference, I thought it was a great success and I hope students are continued to be invited to future conferences.

### **Samantha Cropper**

I found the conference very interesting and extremely worthwhile. It was a great opportunity as I am interested in ecology. I am studying Biology and Geography for A Level so covered my subjects in an interesting way.

I found the Invasive Species Day the most interesting and informative as I did not know that much about this topic. I enjoyed the afternoon at the Durrell Wildlife Park especially as some delegates lived on the islands where the animals came from, thus enabling me to meet people from around the world. I also have learnt about islands which I had not heard of before the conference and found the conversations enlightening and managed to renew an old friendship with Mr Shaun Earl, whom I first met whilst living in Malawi.

The way the delegates from the many different islands are developing new learning resources to teach the students in schools and colleges are extremely important and should be a great success. The ideas are imaginative and interesting and hopefully will encourage and teach the new generations to become more aware of their ecological surroundings and to live more environmentally friendly.

Once again many thanks for the opportunity to have attended the conference.



*Views of the student team at the conference, and giving their presentation in the conclusions session.*



*At the end of the Environmental Education session, UKOTCF Chairman, Mike Pienkowski, (right) presents the first copy of The Natural History of Tristan da Cunha to Simon Glass, Tristan da Cunha Conservation Officer. The book, by Paul Tyler and Alison Rothwell, was produced to make the results of recent studies on the islands available for use by the local school. UKOTCF secured funding for this work, with the help of the Bryan Guinness Charitable Trust.*



## Topic 9: Species recovery including captive breeding

**Session Organiser: Dr John Fa, Director of Conservation Services, Durrell Wildlife Conservation Trust**

For the afternoon and evening of the last day, the main conference moved to Durrell Wildlife Conservation Trust, which had organised a programme. This started with an opportunity to see some of the live exhibits, including some which represented captive breeding programmes in support of conservation in the UKOTs.

After a refreshment break, we moved indoors for presentations on this and related work on species recovery. This started with a general welcome and introduction to Durrell and its vision by Dr Mark Stanley-Price, Chief Executive. This was followed by an outline of Durrell Wildlife Conservation Trust's approach to global conservation by Dr John Fa, Director of Conservation Science, in a presentation *Durrell's TopSpots: A Strategic Approach to Conservation Challenges*.

Turning then to particular projects in which Durrell is playing a key role in partnership with UKOT organisations and others, Fred Burton described work on the Cayman Blue Iguana. For these Proceedings, Fred has incorporated this presentation with that he gave in the Resources session, and it can be found in that section.

Dr Richard Young of Durrell, together with James "Scriber" Daley of Montserrat's Forestry Division and Calvin "Blacka" Fenton of the Montserrat Centre Hills Project, gave a vivid joint presentation on the work in the Centre Hills, and Richard's paper on *Biodiversity assessment of the Centre Hills, Montserrat* is included in this section.

We include also in this section of the Proceedings, two posters on this topic by Dr Samia Sarkis, Department of Conservation Services, Bermuda. *Captive Breeding for Conservation in Bermuda* and *Bermuda Protected Species Programme* illustrate some of the ways in which the *Biodiversity Strategy and Action Plan* (BSAP) is being taken forward in this topic area.

The conference came to a fine climax with an excellent closing dinner hosted by Durrell Wildlife



Conservation Trust in their Dodo Restaurant. At the last, we were honoured with the presence and a closing address by Dr Lee Durrell. We were delighted to learn that the event coincided with the 50th anniversary of the publication of her late husband's classic book *My Family and Other Animals*. As UKOTCF's Chairman noted in his thanks, for many of us, this and Gerald Durrell's other books were key in stimulating our initial interest in wildlife and conservation.

*Lee Durrell speaks at the closing dinner in the Dodo Restaurant, Durrell Wildlife Conservation Trust.*



*Gerald Durrell statue*

# Biodiversity assessment of the Centre Hills, Montserrat

Richard Young, Durrell Wildlife Conservation Trust

Young, R. 2007. Biodiversity assessment of the Centre Hills, Montserrat. pp 318-326 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Having lost 60% of its forest, it is vital that the remaining area in Montserrat's Centre Hills is managed effectively. This paper describes the biodiversity assessment being undertaken as part of the Darwin Initiative Centre Hills management plan project.

**Richard Young**, Durrell Wildlife Conservation Trust, Les Augrés Manor, La Profonde Rue, Trinity, JE3 5BP, Jersey. [Richard.Young@durrell.org](mailto:Richard.Young@durrell.org)

## Need for project

60% Montserrat's forest has been lost. The Centre Hills have:

- High conservation value
- Ecosystem services
- Partially protected but still threatened
- Agricultural history
- Better knowledge of patterns in biodiversity and processes to inform management

- Darwin Initiative Centre Hills management plan project.

## Objectives

The Centre Hills Project is a collaborative project between Montserratian and international partners to:

1. quantify diversity of key taxa







2. map patterns of biodiversity to identify zones of high richness, endemism, and key areas for threatened species in the Centre Hills
3. develop a vegetation map
4. assess potential impact of invasive mammals and plants
5. assess status of endemic species and those of conservation concern
6. provide robust data to inform the Centre Hills management plan for biodiversity conservation and sustainable resource use
7. develop field research and data management skills in Montserrat institutions.

### **Which aspects of biodiversity?**

It would be almost impossible to measure all biodiversity! 'Biodiversity assessment' instead addresses key surrogate groups of animals and plants. Questions then arise:

- How many species?
- Size of populations?
- Where can they be found?

The work includes field surveys and other research. Existing information – scientific and anecdotal – is also used, but scientific information is more

compelling.

The key project partners include Montserrat Department of Forestry, Durrell Wildlife Conservation Trust, Royal Botanic Gardens Kew, RSPB, University of Montana, South Dakota, Montserrat National Trust.

Coverage includes:

- Vascular plants and habitats
- Birds
- Amphibians and reptiles
- Bats
- Insects
- Invasive mammals

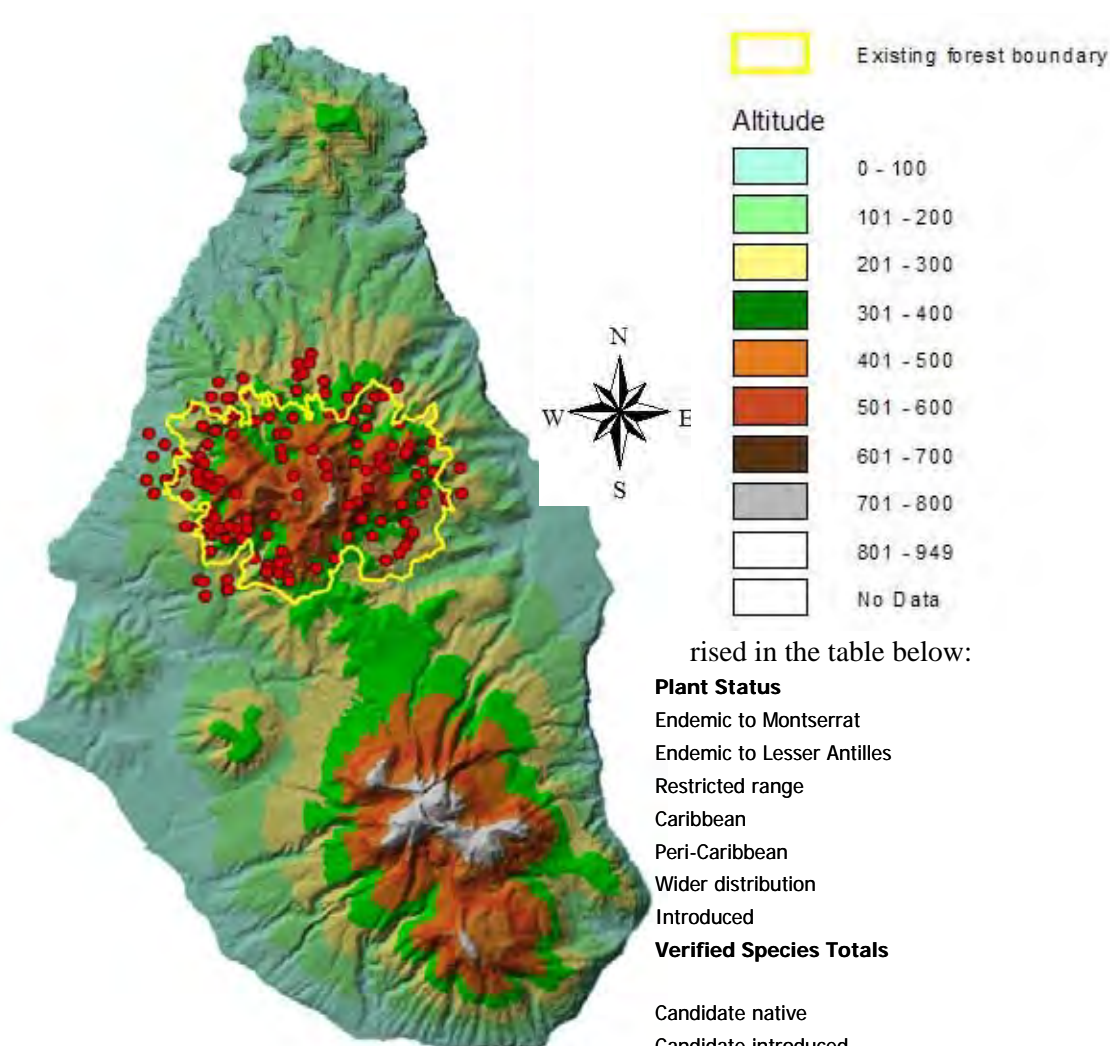
### **Survey Design**

The sampling points are shown in relation to the existing forest boundary in the map on the following page.

### **Plant & Habitats**

- The work includes:
- Review historical botanical data
- Plot sampling





rised in the table below:

Plant Status	Number
Endemic to Montserrat	3
Endemic to Lesser Antilles	70
Restricted range	32
Caribbean	109
Peri-Caribbean	31
Wider distribution	550
Introduced	146
<b>Verified Species Totals</b>	<b>941</b>
Candidate native	3
Candidate introduced	48
<b>Candidate Species Totals</b>	<b>51</b>

**Verified and Candidate Species Totals 992**

The following endemic species are likely to be listed as Critically Endangered:

Species	Representation within Forest Boundary
<i>Epidendrum montserratense</i>	Very Poor
<i>Rondeletia buxifolia</i>	None
<i>Xylosma serratum</i>	?

- Samples collected, processed and sent to Royal Botanic Gardens Kew
- Species list
- Index of plant diversity
- Vegetation structure and habitat mapping

The results of the plant survey work are summa-







## Birds

The bird work includes:

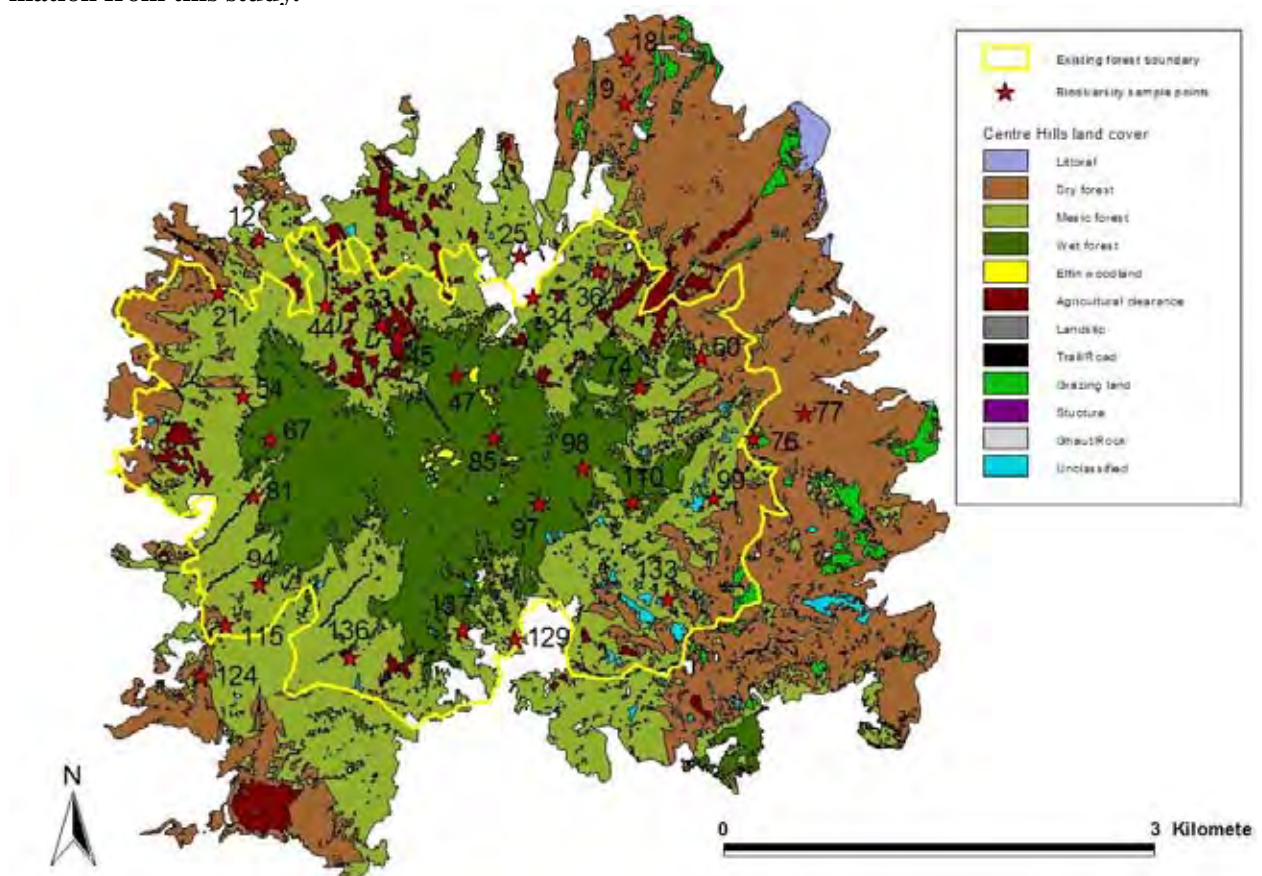
- Monitoring programme 1997 onwards
- Conservation of Montserrat oriole
- Point count surveys
- Excellent dataset, including trend monitoring and spatial patterns in diversity.



*Some Montserrat forest birds*

## Habitats

The map below summarises the habitat information from this study.



The bird assemblage of Montserrat is not very diverse; the Centre Hills do not have many different bird species:

- About 15 true forest species nest
- About 25 species nest
- 27 migrant species.



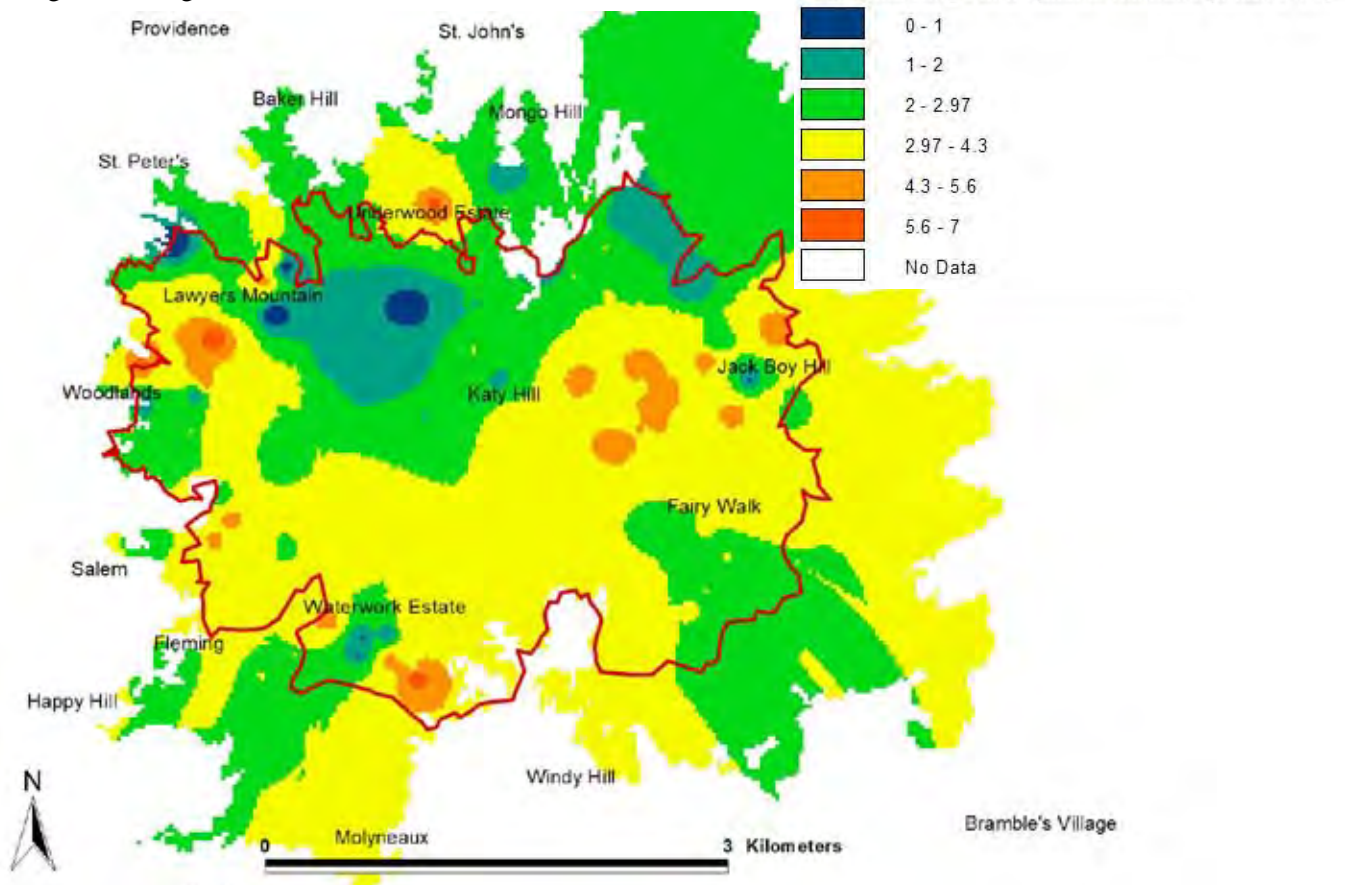
A similar forest in Central America might have 200 species! However, Montserrat is globally important for birds, with two globally threatened species:

- Montserrat Oriole: 'Critically Endangered' (above)
- Forest Thrush: 'Vulnerable' (opposite).

There are also eleven 'Restricted-range Species'. The species richness of these is mapped below.

## Amphibians and reptiles

This work includes line-transect surveys and refuge searching.



All 9 native species have been recorded during this biodiversity assessment – the first time in a single study! There is a high species richness, especially given the size of island. In comparison, there are only 6 reptile species in UK.

Montserrat holds two Critically Endangered species:

- Montserrat galliwasplizard *Eleutherodactylus johnstonei*
- Mountain chicken frog *Leptodactylus fallax*.

## Montserrat galliwasplizard

This is something of a 'biogeographical enigma' It was long thought to be extinct.





There were four sightings in the Woodlands area in 2006. The study has shown the first systematic evidence of highly restricted range and rarity.

There is an urgent need for:

- Research into status and conservation efforts
- Species action plan
- Habitat protection
- Rat control
- Habitat restoration
- Domestic pets - assessment of impact
- Possibly captive breeding.

The map below shows herptile species richness based on these studies.



## Bats

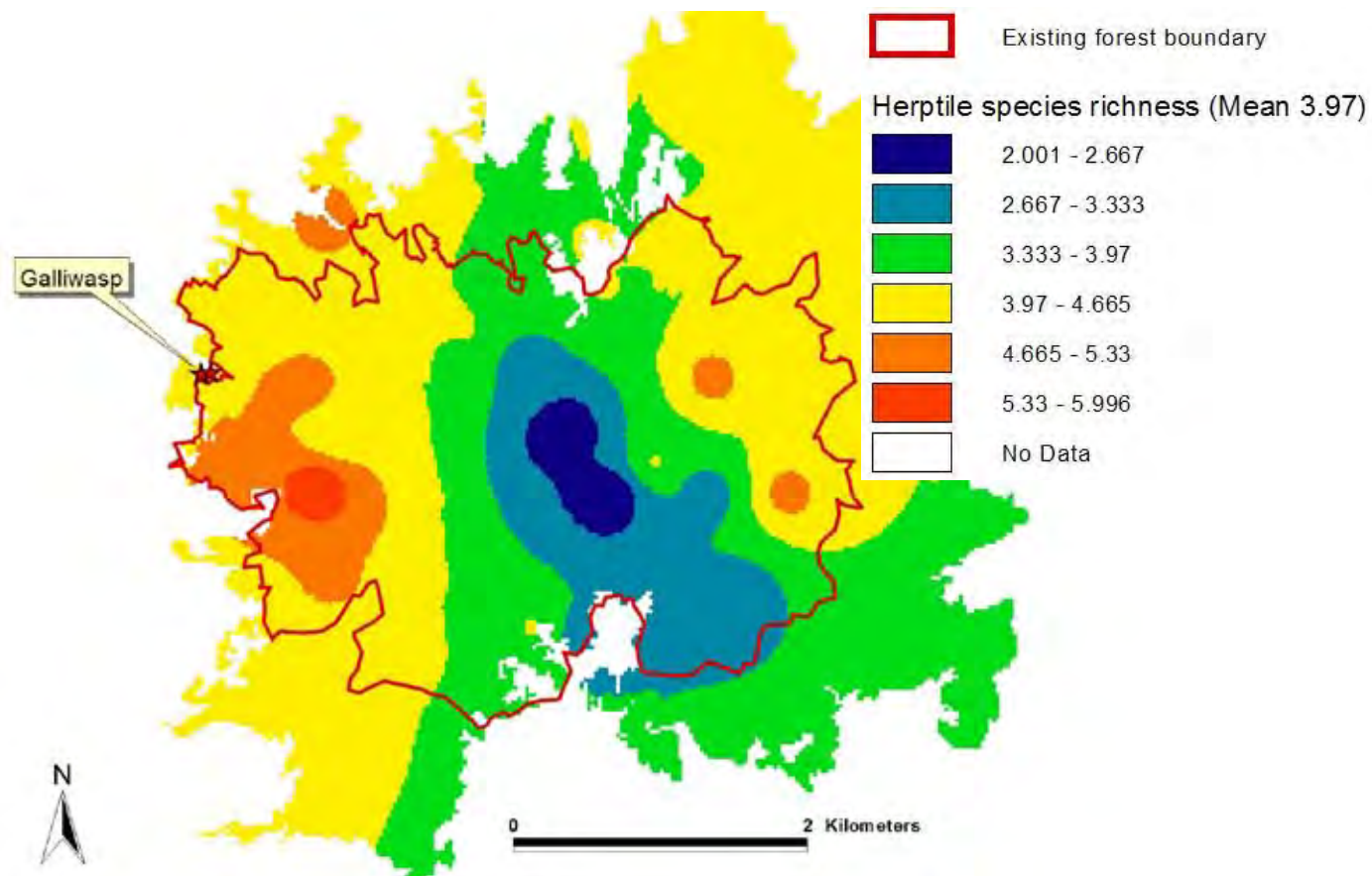
Work has included mist-netting and bat detectors. All 10 species of bat have been recorded for the first time in one study. Two Endangered bats previously thought to be extinct were caught:

*Sturnira thomasi vulcanensis*

*Chiroderma improvisum*

There is a high number of species for the size of island.

The endangered white-lined bat *Chiroderma improvisum* was caught in dry deciduous forest at Corbett Spring. Fewer than a dozen of these bats have ever been examined. One specimen



was caught on Montserrat 20 years ago, but it had been presumed extinct since volcanic eruptions destroyed the habitat where it was found. It still exists in small numbers on the neighbouring island of Guadeloupe. The specimen caught on this expedition was a lactating female, suggesting that there is still a breeding colony on Montserrat.

The yellow-shouldered bat *Sturnira thomasi vulcanensis* is an endemic subspecies (if a subspecies can be described from a single specimen), of which a single individual was caught on Montserrat (by Scott) 10 years ago. It had also been presumed extinct, but the individual caught this year was also a lactating female, suggesting a breeding colony on Montserrat.

Additionally, a bat was caught at Bottomless Ghaut this year and passed over as an Ardops, but following discussions with Gary Kwiecinsky, it is believed that this may have been a *Stenoderma rufum*, a species which has not previously been described further south than the Virgin Islands.

Bats are the only extant native mammals in the Lesser Antilles. They are vital for forests, because of roles in flower pollination and seed dispersal. Some plants completely rely on bats for their reproduction. They play a role also in insect control.

Bats are wide-ranging and use seasonal resources. Protection of key resources is required in and outside Centre Hills:

- Roosts
- Water bodies
- Fruiting and flowering trees.

Key areas mapped are shown below.

## Insects

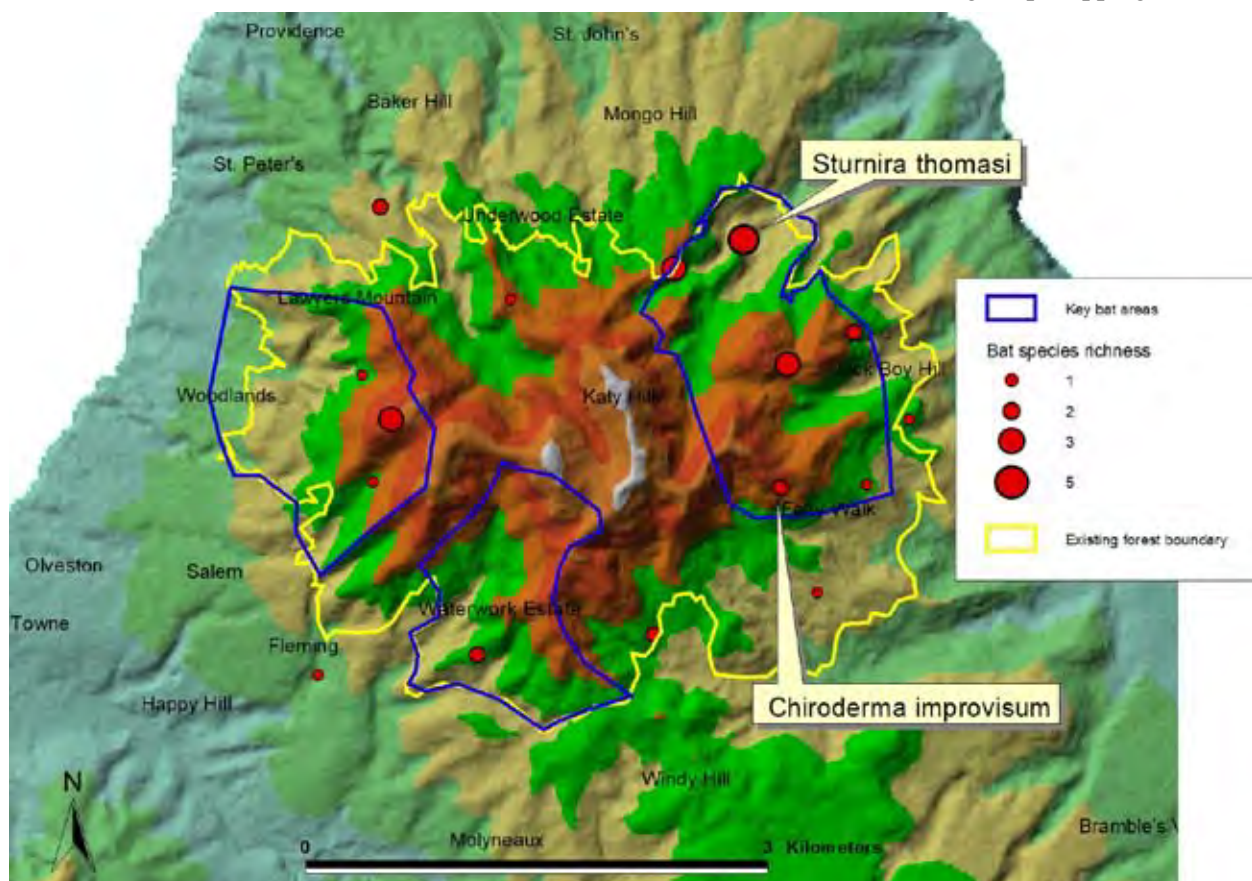
Insects represent the majority of the non-microbial biodiversity, with Coleoptera in the lead role. A species list is being generated, based on a variety of trapping techniques. About 1 million specimens have been collected.

Taxonomy is being handled by Montana State University, who have found more than 1000 species of insects, including over 700 species of beetles. Many species are new to science. Species richness is high, given the size of the island.

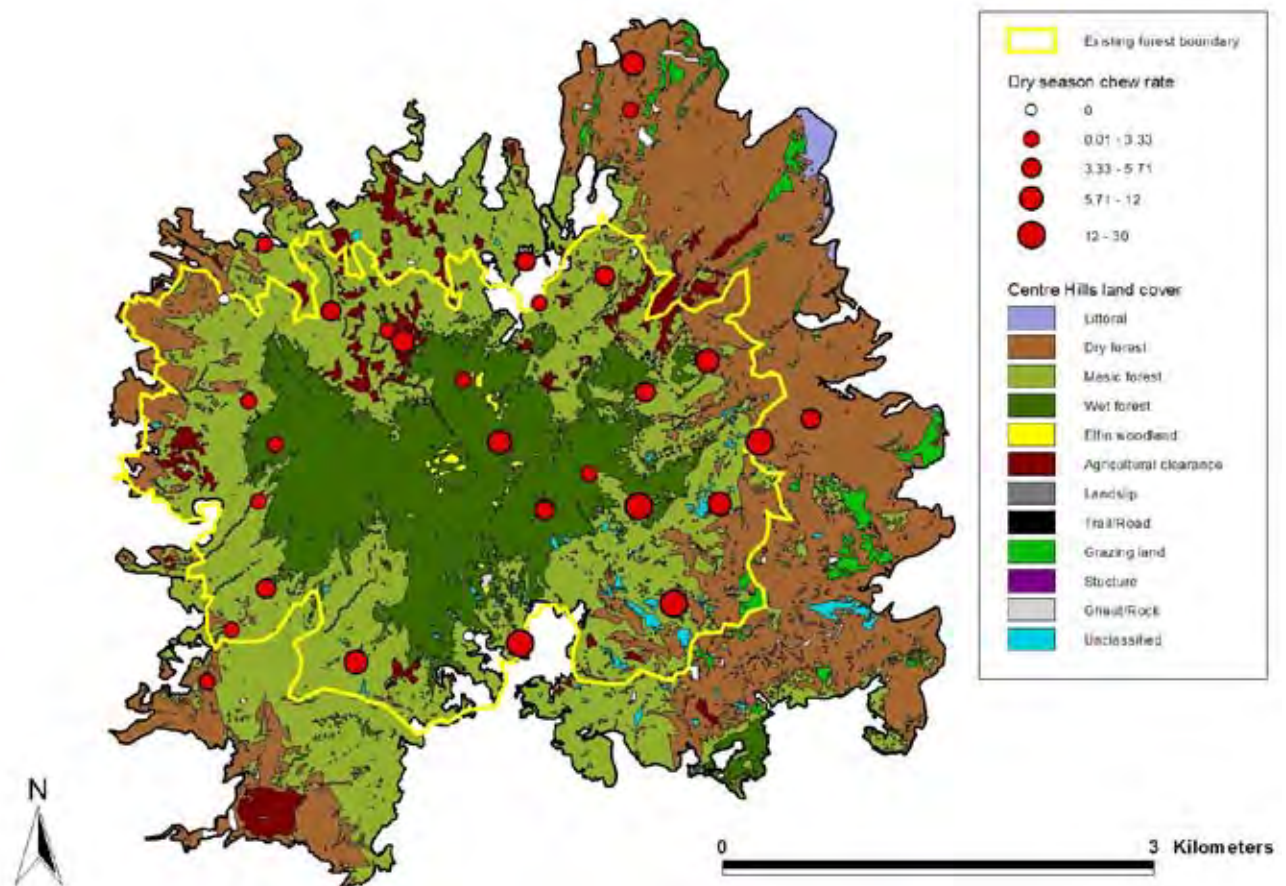
## Invasive mammals

These include feral pigs and rats. Rats are nest predators of oriole and forest thrush, but their impacts are likely to be pervasive.

Studies are conducted using snap-trapping and







chewsticks. Rats are distributed across the Centre Hills (see map above). There are high densities of brown and black rats.

Rats densities are correlated with numbers of exotic fruiting trees (and altitude). Experiments are in progress to quantify impact of rats on native flora and fauna, as well as on how to reduce impact. Major components may include both lethal control and habitat restoration.

### Centre Hills biodiversity

The study has underlined the high conservation and biodiversity value of the Centre Hills. The area is internationally important on a variety of measures.

Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, page 325

This gives responsibilities to the UK as well as to the UK Overseas Territory of Montserrat.

The project has delivered robust information and recommendations for management. Intensive management is needed for long term conservation, and there is a requirement for zoning.

### How to prioritise biodiversity?

This could be based of a variety of factors:

- Globally threatened species
- Endemic species
- Areas of highest species richness
- Optimal habitats
- A full range of habitat types
- Plants and animals that are used by humans
- All of the above.

Conservation objectives need to be defined.

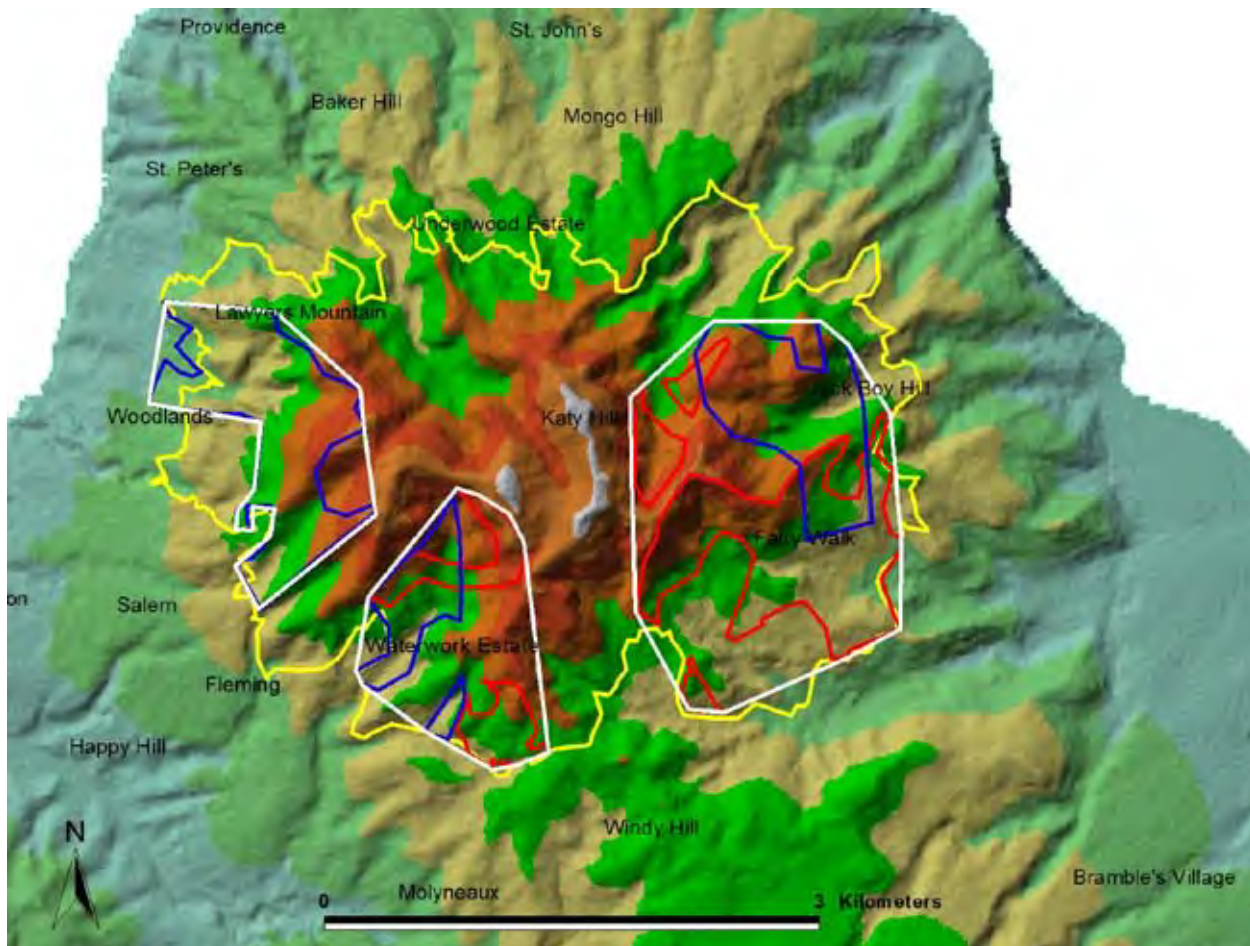
Other aspects could include:

- Irreplaceability
- Representativeness
  - of Species
  - of Communities
- Viability

A mapping approach is illustrated on the next page. Here:

- yellow indicates the existing forest boundary;





- red indicates the most important areas for Oriole, Forest thrush, Mountain chicken;
- blue those for herptiles, bats, and restricted-range birds; and
- white possible priority biodiversity areas on the basis of these.

## Project outputs

The project outputs will be:

- Improved knowledge
- Report
- Maps
- A biodiversity data-base-GIS
- Baseline data for monitoring (pressure, state and response)
- Improved ecological survey and monitoring skills.



# Poster: Captive Breeding for Conservation in Bermuda

Samia Sarkis, Department of Conservation Services, Bermuda

Sarkis, S. 2007. Captive Breeding for Conservation in Bermuda. pp 327-328 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pi-enkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The recovery plan framework, discussed in *The Bermuda Protected Species Programme* provides the rationale for capacity building as well as acting as leverage in the securing of funds. As some of these plans call for breeding programmes for certain terrestrial and aquatic species, the facilities for such conservation care are essential.

Terrestrial conservation has been very proactive in Bermuda, and has proved successful in the recovery of some flowering species, such as the Bermuda Cedar. This particular project is a good example of community engagement through the development of *Plant One on Me* programme, resulting in the existence of cedars in almost every Bermudan backyard. Government has supported this through the propagation of seedlings at Tulo Valley, a government-operated nursery. Government is further showing its commitment to the preservation of biodiversity by planting endemics and natives in National Parks, thanks to seedling production by Tulo Valley Nursery. This nursery has been recently upgraded (2006) to accommodate the growing needs for threatened endemic and native plants. It is also anticipated that this upgraded facility will allow for the propagation of more delicate endemics, such as Governor Laffan's Fern, currently extinct in the wild. Emergency measures for this fern species were necessary to prevent its loss, and a collaborative programme with the propagation laboratory at Omaha Zoo, was initiated in 2003. Several trials have been made to transfer prothalli cultures to Bermuda for acclimation, growth and transfer to the natural environment. It is anticipated that the improved facilities at Tulo Valley will result in successful growth and survival of fern cultures. There are a total of 6 fern species and 11 flowering plants listed under the Protected Species Act, of which several will benefit from the improved nursery facilities at Tulo Valley.

The existing Bermuda Aquarium Museum & Zoo (BAMZ) also provides opportunities for captive breeding of terrestrial species. Bermuda's endemic landsnail, *Poecizolonites circumfirmatus*, is the object of a collaborative programme with the London Zoo. The main focus is the production of juveniles under controlled conditions, for release in selected sites in the natural environment. This species is currently under threat from loss of habitat, due for the most part to human development, and from the effect of introduced predatory snails and flatworm species. A preliminary trial by the London Zoo has demonstrated the possibility of breeding juveniles; the know-how is to be transmitted to staff at BAMZ, for a comprehensive recovery programme.

Marine conservation has been conducted mainly through passive protection by the prevention of collection, damaging, etc. of marine species. However, several of these threatened species have been protected since 1972, and have shown little sign of recovery since. It is for this reason that a facility dedicated to the rearing of the early life stages of marine species, providing the capacity to investigate the requirements for growth and survival for a range of threatened species, has been built. This "marine conservation care" facility has been completed in 2006, partially funded by OTEP. Proposed work in the first year of operation focuses on the Queen Conch *Strombus gigas*, Seahorse species, including *Hippocampus erectus*, native scallop species (*Euvola ziczac* and *Argopecten gibbus*), corals and killifish. All of the species listed above are native to Bermuda, and are threatened globally. This global status provides an added dimension to the work carried out in Bermuda, contributing to international conservation initiatives for these species. They have been selected

locally as priority species, in part due to the current public interest and their nature as local flagship species, resulting in available funds and commitment from the community, and in part due to the existing available knowledge, facilitating the first actions towards implementation and creating a positive public image of conservation efforts. A substantial component of this marine conservation care work is education, namely for the youth of Bermuda, in the tools available for preservation of the marine environment. Hands-on workshops are planned for students demonstrating some of the species requirements for reproduction, growth and survival. It is also anticipated that thanks to the well-developed culture techniques for some of these species, namely for Queen Conch and scallops, the rearing work will not only result in boosting of the natural stocks, but may even lead to future use of the resources in a sustainable manner.

In conclusion, the improved facilities described above are a first step towards optimising conservation care efforts by changing our approach to recovery from a passive mode to an active mode; this is especially true for aquatic species in Bermuda. Enabling such capacity building paves the way for the implementation of a number of recovery plans for listed species.

**Dr Samia Sarkis**, Department of Conservation Services, P O Box FL145, Flatts FLBX. Bermuda. [scsarkis@gov.bm](mailto:scsarkis@gov.bm)



# Poster: Bermuda Protected Species Programme

Samia Sarkis, Department of Conservation Services, Bermuda

Sarkis, S. 2007. Bermuda Protected Species Programme. pp 329-330 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The Protected Species Programme in Bermuda addresses some of the objectives of the Biodiversity Strategy and Action Plan (BSAP), and is supported by the newly enacted Protected Species Act 2003. This Act mandates the listing of threatened species according to IUCN criteria, and requires the development of a recovery plan within 1 year for those species classified as “Critically Endangered” and “Endangered”, and within 3 years for those classified as “Vulnerable”. Care was taken in selecting the species for listing, as future recovery actions necessitate the use of limited resources, in terms of both personnel and facilities. The aim of the programme is to develop practicable plans, which will lead to positive results in species restoration. For this reason, the list of Protected Species was in a first instance kept short; however, it is considered a working list, to be reviewed and modified if needed, every two years.

The listing of species has been conducted over the past year in a systematic fashion, considering first endemic species, and then native species. A total of 291 endemic species are recorded as extant in Bermuda; 53 endemic species, of which 23 are cave organisms, and 25 native species have been listed. Although it can be argued that all endemic species in Bermuda should be listed, considering the small extent of occurrence constrained by Bermuda’s land mass (50 km<sup>2</sup>), several of the endemics are common in Bermuda, making it difficult to justify locally the dedication of resources for their well-being. For this reason, not all endemics were listed. Furthermore, the endemic status for some of the species is debatable, when records rely on limited sightings, (for example the Bermuda Bank Bass, collected twice from deep waters). Finally, such groups as insects, diplopods, turbellarians, were not considered in this first listing for lack of expertise on these groups and for practical reasons. This first list was presented to Cabinet for approval during 2006, with a summary of the recovery actions and associated budgets required. One full-time staff member has been dedicated to the development of the recovery plans, supported in part by OTEP.

Conservation efforts in Bermuda have been on-going for several decades, focusing on species appealing to the public, and very dependent on personnel expertise and interest. For this reason, conservation has had a somewhat haphazard approach to date. The main goal of the recovery plans is therefore to encompass data obtained from previous efforts and current work, and to provide the framework for continued action. The recovery plans are an excellent means of providing cohesion and ensuring continuity in these conservation efforts. These have also given the opportunity to conduct an Audit of Resources, outlining the available resources (both facilities and personnel), as well as those lacking but necessary to the implementation of recovery plans. Finally, this wider approach to the recovery of Bermuda’s fauna and flora provides the capability of prioritizing actions and drawing a list of emergency measures preventing the further loss of our endemic species.

The main approaches to recovery include:

- Habitat Protection
- Translocation of mature individuals to adequate habitats
- Active propagation through breeding surveys
- Population surveys for data deficient species
- Public Awareness and Education
- Community Involvement

Habitat Protection is essential for survival of species, and is probably the most difficult to achieve in such a highly populated island like Bermuda. It is an essential component to many of the recovery plans and requires the identification of important habitats or ecosystems, such as mangroves and seagrass beds. There exists several levels of habitat protection in Bermuda, under the Parks Act, such as Woodland Reserves, National Parks, Nature Reserves, and Agricultural land. There are furthermore a total of 15 RAMSAR sites and also Marine Protected Areas. A further classification, “Critical Habitats”, has stemmed from the recovery plans. A total of 16 well-defined terrestrial sites and all caves have been identified as critical habitats. This listing has been achieved by answering the following question: “Should this habitat disappear, will it entrain the extinction of the species dependent on it?” Severe restrictions are placed on these sites, such as no public access, no building, cutting or removing of any species, etc. The Protected Species Act provides the legislation to classify any site as “Critical Habitat”, whether it is owned privately or not. However, negotiations have been initiated with the private landowners to obtain their support, and resolve this issue in an amicable manner. Habitat management is the responsibility of the Department of Conservation Services, in this way ensuring control of invasives, and minimizing the responsibility of the private landowner. A first negotiation has been successful to date. Fortunately, most of the Critical Habitats are government owned, facilitating the process. Currently, 23% of the land is protected in Bermuda (excluding caves), and approximately 32% of the Reef Area, under the classifications mentioned previously.

The recovery plans can be species-specific, as for the Bermuda Skink for example, or can be group recovery plans, as for several of the flowering species, which require similar strategies of surveys, translocation and/or active propagation. All plans have a public awareness and education component to engage the community in various conservation efforts. As explained in the “Captive Breeding” poster, some of these community-based initiatives have proved very successful.

Finally, all recovery plans include the following:

- Identification of threats
- Identification of emergency measures
- Actions for enhancing public awareness
- Step-by-step implementation schedule
- List of criteria for defining recovery
- Estimated time for recovery

The ultimate goal is the removal of species from the Protected Species List as they achieve self-sustainability in the natural environment.

**Dr Samia Sarkis**, Department of Conservation Services, P O Box FL145, Flatts FLBX. Bermuda. [scsarkis@gov.bm](mailto:scsarkis@gov.bm)

## Topic 10: Posters and other items on other topics

We have tried to include in these Proceedings the posters where these were made available to the editor. Those posters which related to the topics of conference sessions have been included with those sessions. The other posters received are included in this section.

In a note on all the posters, Jennifer Gray, of Bermuda, reported:

Some 40 presentations dotted around the walls of our conference rooms are most definitely worthy of acknowledgement. Overall they were impressive and expressed a deep sense of national pride by the authors. This especially pertained to those which spoke of native and endemic biodiversity. It also is evident that we have amongst us an extraordinary gathering of photographers; the quality of imagery is suggestive of National Geographic quality in many cases. Many of these presentations were a welcome window into the culture of our special territories where we saw community participation and homeland names entwined in progressive monitoring, research, and educational programmes.

We can see from these presentations that OTEP has a supporting presence throughout the territories and the Darwin Initiative continues to do good work. It is somewhat concerning that these sources for funding are so limited but at the same time refreshing to see JNCC now offering some assistance.

Posters revealed that throughout the territories we are all working hard and going in the right direction. If Ascension Island was successful at eradicating the entire island of feral cats and enabling the successful re-establishment of a sea-bird colonies and Falklands can succeed at reducing the mortality rate in sea-bird populations by 90%, then we can safely say that any effort is worthwhile and that there is hope for the biodiversity in our territories in the hands of this group of passionate environmentalists.



*At work throughout the conference!: Dace Ground (left) consults Eudora Fergus and Mike Pienkowski on points in the conference summary and conclusions.*



## Poster: BVI National Parks Trust

**Joseph Smith Abbott and Nancy K. Woodfield-Pascoe, British Virgin Islands National Parks Trust**



Smith Abbott, J. & Woodfield-Pascoe, N.K. 2007. BVI National Parks Trust. p 332 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The British Virgin Islands National Parks Trust is a statutory body established by the Government of the British Virgin Islands through the National Parks Ordinance of 1961. Under this Ordinance, the Trust is responsible for managing natural and historic resources in legally declared protected areas. The Marine Parks and Protected Areas Ordinance of 1979 further strengthens the Trust's role in acquiring, integrating and managing marine areas and adjacent terrestrial habitats. Twenty National Parks and Protected Areas have been established from 1969 to 2003.



Additionally, the work of the Trust supports the fulfilment of regional and international agreements designed to protect the natural environment and the cultural heritage of the BVI. All activities in protected areas are coordinated for the rational and sustainable utilisation of natural resources.

**Joseph Smith Abbott & Nancy K. Woodfield-Pascoe**, British Virgin Islands National Parks Trust, P O Box 860, Road Town, Tortola, British Virgin Islands.  
[director@bvinationalparkstrust.org](mailto:director@bvinationalparkstrust.org) & [nkwoodfield@yahoo.com](mailto:nkwoodfield@yahoo.com)

# Poster: Anegada Vegetation Habitat Mapping

**Nancy K. Woodfield-Pascoe and Joseph Smith Abbott, British Virgin Islands National Parks Trust**



Woodfield-Pascoe, N.K. & Smith Abbott, J. 2007. Anegada Vegetation Habitat Mapping. p 333 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

A Darwin Initiative funded project to assess Anegada's coastal biodiversity from 2003-2006 resulted in vegetation habitat mapping using geographic information systems (GIS), in addition to the collection of flora species for seed banking and herbaria samples in collaboration with the Royal Botanic Gardens Kew.

Approximately 60,000 seeds from 16 species of flora were collected from throughout the BVI for inclusion in the Royal Botanic Gardens Kew Millennium Seed Bank Project. Additionally, 120 herbarium specimens from 40 species of flora were collected and sent to Royal Botanic Gardens Kew for curation, with half of the specimens accessioned into the Kew herbarium, with the remainder being temporarily stored until the BVI herbarium is established.



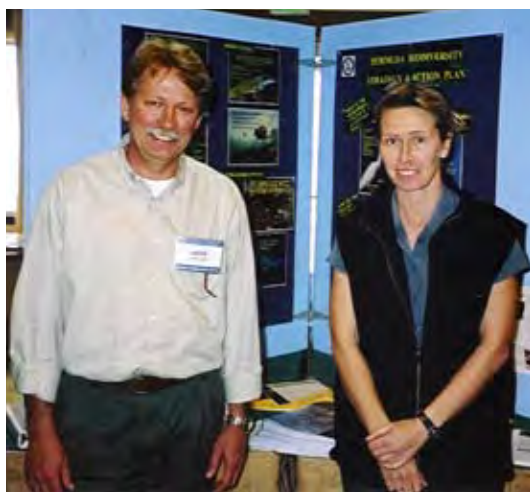
The GIS habitat map of Anegada will provide an important reference map for future scientific research on Anegada's flora and also the continued research of the critically endangered Anegada Rock Iguana *Cyclura pinguis* and its native habitat.

**Nancy K. Woodfield-Pascoe & Joseph Smith Abbott**, British Virgin Islands National Parks Trust, P O Box 860, Road Town, Tortola, British Virgin Islands.  
[nkwoodfield@yahoo.com](mailto:nkwoodfield@yahoo.com) & [director@bvinationalparkstrust.org](mailto:director@bvinationalparkstrust.org)

# Poster: Development and population of a dynamic, map-based, interactive Bermuda biodiversity web portal for island-wide and global information dissemination

**A.F. Glasspool, J.A. Ward, W. Sterrer, M. Outerbridge and T.J. Murdoch,**  
**Bermuda Zoological Society and Department of Conservation Services, Bermuda**

Glasspool, A.F., Ward, J.A., Sterrer, W., Outerbridge, M. & Murdoch, T.J. 2007. Development and population of a dynamic, map-based, interactive Bermuda biodiversity web portal for island-wide and global information dissemination. pp 334-336 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)



*The first two authors*

In a community-wide collaborative initiative, the Bermuda Biodiversity Project has been collating information on Bermuda's biodiversity into a central repository at the Bermuda Aquarium, Museum and Zoo, and at the same time has been undertaking baseline studies in an effort to fill the information gaps, so as to promote more informed environmental management. A Bermuda Natural History Bibliography has been established, and a Bermuda Species database is a 'work in progress' with over 7,000 species listed to date. However, access to this vast resource has been severely limited and is currently restricted to those who physically visit the facility. Scientists, educators, students, resource managers, and visitors have had no remote access to any of this information. Moreover, much of the biodiversity information has been contained in specialised scientific papers in a format that is of little interest to the wider public.

Funded through OTEP and the Department of Conservation Services, the design and population of a purpose-designed web portal is a remedy to this situation. More than just an online environmental encyclopaedia, the web portal is using the latest Flash multimedia technology and a proprietary mapping system that powers an interactive map of Bermuda, to make available critical biodiversity information in an exciting, interactive and educational format. Once compiled, the user will be able to view distribution data for habitats and key species (endemics, protected species, invasive species, etc.) as layers which may be switched on or off so that they can be superimposed upon one another, as well as follow dynamic links that lead to the related data and literature. They will have access to the searchable Species Database and Bermuda Bibliography. Key reference materials and teaching materials including Powerpoint presentations will be made available as pdf files whilst streaming video and still images will bring texts to life. Such an interactive approach is long overdue. Local conservationists and educators have long realised the need for a more engaging strategy for promoting the Island's unique natural history and the conservation issues faced.

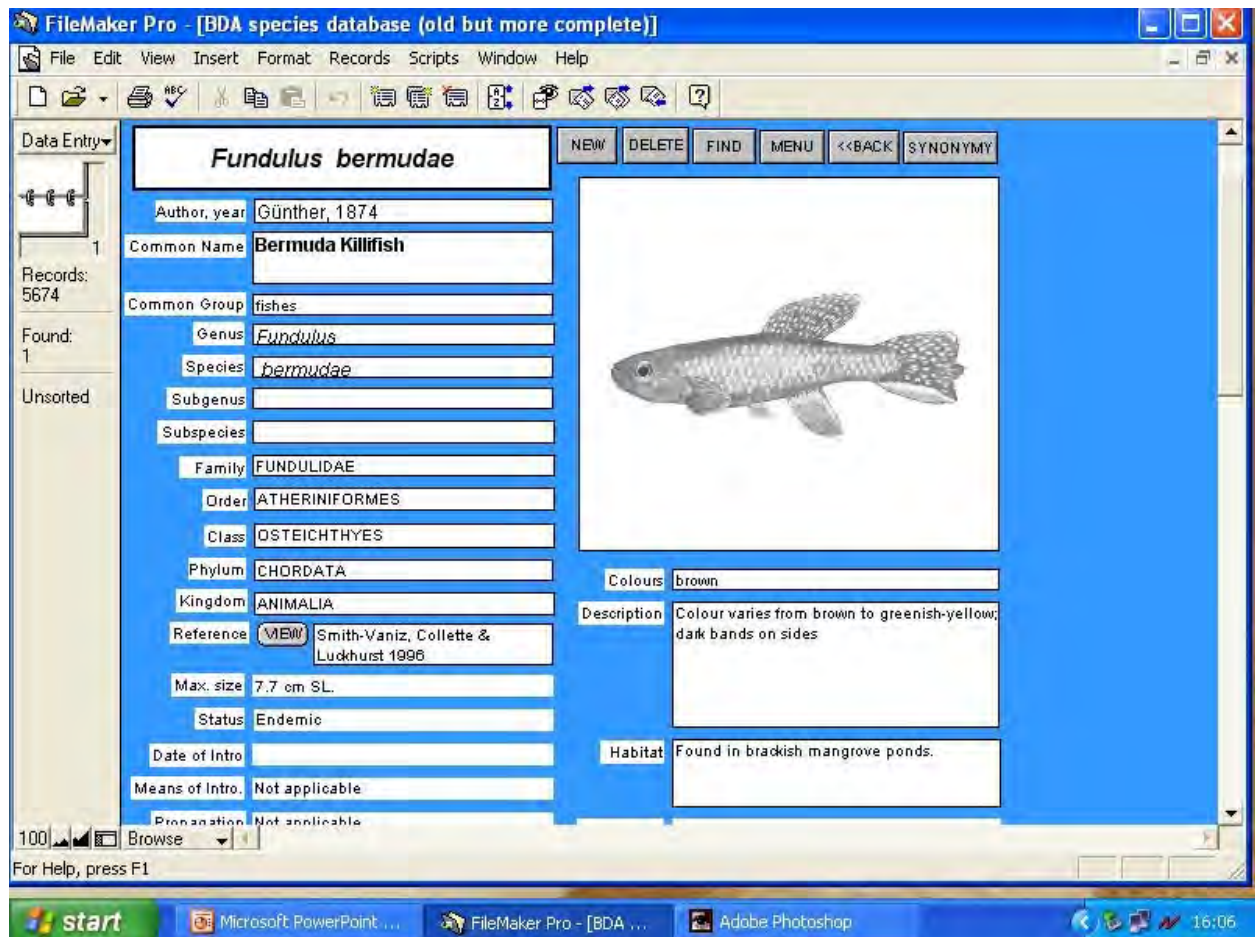
**A.F. Glasspool, W. Sterrer, M. Outerbridge & T.J. Murdoch,** Bermuda Zoological Society, P.O. Box FL 487, Flatts, Bermuda, FL BX. [afglasspool@gov.bm](mailto:afglasspool@gov.bm);  
**J.A. Ward,** Department of Conservation Services, P.O. Box FL 145, Flatts, Bermuda, FL BX. [jaward@gov.bm](mailto:jaward@gov.bm)

## Background

Bermuda is one of the best studied islands in the world. Over 4,000 scientific documents describe

the island's natural history, which includes over 8,000 locally-recorded species, and numerous isolated datasets exist which house critical biodiversity information. From the enactment of the



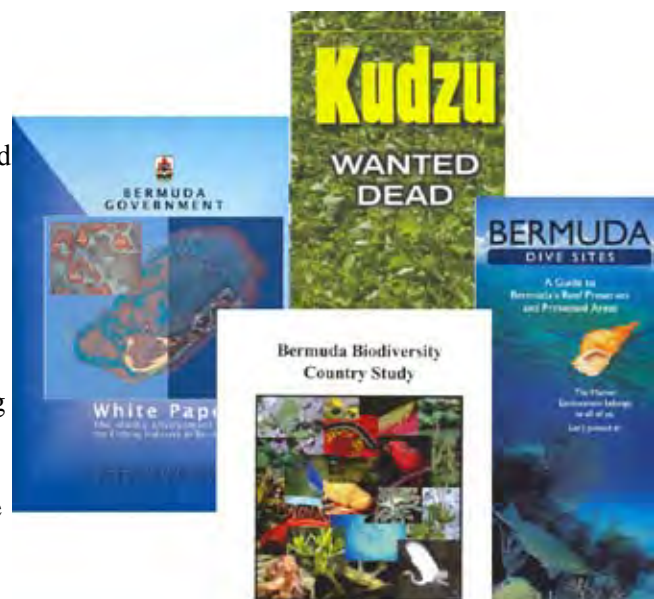


earliest conservation legislation in the western hemisphere to the development of the first widely-recognised example of an ecosystem restoration effort, Bermuda has often been seen as a leader in good conservation practices. At the same time, human colonisation and development have resulted in one of the world's most densely populated islands (1,500 people per km<sup>2</sup>), and a landscape that is widely considered as suburban. Major threats include habitat loss and competition with invasive species, largely mediated by human impact. These changes have resulted in the known extinction of 25 endemic species, the decimation of an estimated 200 native species, and naturalisation of at least 1200 exotic terrestrial species. Bermuda's biodiversity is seriously threatened.

One of the primary goals for launching the Bermuda Zoological Society's Bermuda Biodiversity Project in 1997 was the collation of all the existing historical data on Bermuda's biodiversity. There was justifiable concern that much of this information was widely scattered and not easily accessible to current researchers and resource managers. The design and population of a purpose-designed web page seeks to remedy this situation.

## Project Goals

More than just an online environmental encyclopaedia, the web site under development is using the latest Flash multimedia technology and a proprietary interactive mapping system which powers an interactive map of Bermuda, the "LookBermuda





map” ([www.lookbermuda.com](http://www.lookbermuda.com)) to make available critical biodiversity information in an exciting, interactive, educational format. The user will be able to view habitat distributions and key species distributions (endemics, protected species, invasive species) as layers which may be switched on or off so that they can be superimposed upon one another, as well as data and literature related to them. They will have access to the searchable Species Database and Bermuda Bibliography. Key reference materials and teaching materials including powerpoint presentations will be made available as PDF files whilst streaming video and still images will bring texts to life.

## Outputs

- A searchable species database incorporating taxonomic information on 7,200 species, and descriptive information and scanned illustrations of 2,000 of these
- A searchable bibliography with over 4,200 Bermuda-based scientific references
- GIS-integrated habitat and species layers for all key habitats, nature reserves, protected areas, endangered species, natives and endemics
- Key Bermuda environmental resource materials accessible via the web as PDF files (technical reports, brochures, species recovery and action plans, teaching materials, ECOfiles)

- An online interactive field guide to Bermuda’s natural history
- Curriculum-driven online lesson plans
- Streaming video of a suite of ongoing conservation and research initiatives
- Powerpoint presentations of key studies and their findings
- An online map-based reporting mechanism to allow members of the public to report unusual species sightings on land or at sea.

## Acknowledgements.

We gratefully acknowledge the support of the UK Government’s Overseas Territories Environment Programme, the Bermuda Government and the Bermuda Zoological Society for this initiative.

This is Contribution # 131, Bermuda Biodiversity Project (BBP), Bermuda Aquarium, Natural History Museum and Zoo.

## **Poster: Distribution, population assessments and annual reproductive cycles of Bermuda's endemic killifishes**

**Mark Outerbridge, John Davenport and Anne F. Glasspool, Bermuda Zoological Society, and Department of Zoology, Ecology & Plant Science, University College Cork, Ireland**

Outerbridge, M., Davenport, J. & Glasspool, A.F. 2007. Distribution, population assessments and annual reproductive cycles of Bermuda's endemic killifishes. pp 337-339 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

*Fundulus bermudae* and *Fundulus relictus* are endemic to the islands of Bermuda and are listed as protected species in the Bermuda Protected Species Act 2003. These killifishes were described as abundant and widespread in the wetland communities of Bermuda during the late nineteenth and early twentieth centuries, but are now only found in nine small, isolated ponds. Quantitative assessments of each pond population have been lacking and are limiting conservation efforts for these species. Surveys were undertaken during 2004-2005 to determine the current distribution as well as to make estimates of the size and structure of each *Fundulus* population. This was achieved by performing a census based on mark and recapture sampling while simultaneously gathering size frequency and demographic variance data to assess the condition of each population. In addition to these assessments, the annual reproductive cycle was described from the population inhabiting Mangrove Lake.

**Mark Outerbridge & Anne F. Glasspool**, Bermuda Zoological Society, P.O. Box FL 145, Flatts, FL BX, Bermuda. [mouterbridge@gov.bm](mailto:mouterbridge@gov.bm)

**John Davenport**, Department of Zoology, Ecology & Plant Science, University College Cork, Distillery Fields, North Mall, Cork, Ireland



# Distribution, population assessments and annual

Mark Outerbridge\*, John Dav

\*Bermuda Biodiversity Project, Bermuda Zoological Society, P.O.

† Department of Zoology, Ecology & Plant Science, Unive

**Overview:** *Fundulus bermudae* and *Fundulus relictus* are endemic to the islands of Bermuda and are listed as protected species in the Bermuda Protected Species Act 2003. These killifishes were described as abundant and widespread in the wetland communities of Bermuda during the late nineteenth and early twentieth centuries, but are now only found in nine small, isolated ponds. Quantitative assessments of each pond population have been lacking and are limiting conservation efforts for these species. Surveys were undertaken during 2004-2005 to determine the current distribution as well as to make estimates of the size and structure of each *Fundulus* population. This was achieved by performing a census based on mark and recapture sampling while simultaneously gathering size frequency and demographic variance data to assess the condition of each population. In addition to these assessments, the annual reproductive cycle was described from the population inhabiting Mangrove Lake.



Fig.1 Setting the baited minnow traps

Fig.2 Mature male killifish



Fig.3 Mature female killifish with green VIE tag

**Introduction:** Bermuda's anchianine ponds are isolated, saline, land-locked bodies of water with permanent connections to the ocean. Temperature and salinity are dependent upon the amount of sea water that enters from the ocean and vary from pond to pond, showing predictable seasonal patterns (1). The relative stability and isolation of these ponds has created sanctuaries for the organisms living in them and have enabled species like the killifishes to evolve to the degree of endemism. To date, 433 species of fishes have been recorded in Bermuda, of which eight are currently recognized as valid endemic species (2). Two of these eight endemics belong to the genus *Fundulus*; *Fundulus bermudae* and *Fundulus relictus*. These fishes are believed to be descendants of the *Fundulus heteroclitus* - *F. grandis* species group, originating from populations on the east coast of North America (3).

**Tagging:** 44 different areas around Bermuda were surveyed using a combination of direct observation and baited trapping (Fig.1). Where extant populations were found a census was performed based on the Petersen Index methodology of mark and recapture (4) using visible implant elastomer (VIE) tags. These biocompatible tags provided a clearly visible internal mark and were given to fish under full anaesthesia, immediately below the skin (Fig.4). Sex and total length were determined at the time of tagging.

**Results:** The surveys confirmed the existence of populations in the following locations only; Lover's Lake, Bartram's Pond, Mangrove Lake, Trott's Pond, Blue Hole Bird Watchers Pond, both East and West Walsingham Ponds, Warwick Pond and Evan's Pond (Fig. 5). No additional *Fundulus* populations were discovered. Size ranges, mean lengths, sex ratios and population estimates for 7 populations are displayed in Table 1. Females were significantly larger than males of the same age from Lover's Lake, West Walsingham, and Warwick Pond. Additionally, females outnumbered males in all ponds surveyed, except Trott's Pond where the sexes occurred in equal numbers.

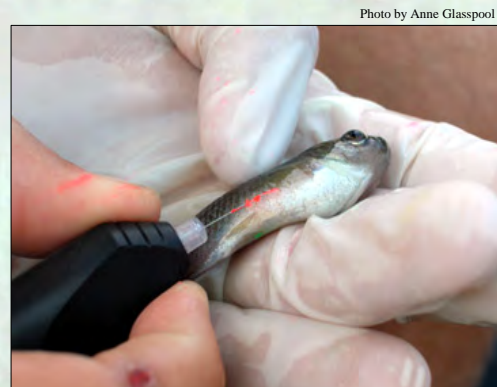


Fig.4 Injecting *F. bermudae* with red VIE

**Acknowledgements:** This investigation was initiated by the Bermuda Biodiversity Project, and sponsorship provided by the Ernest E. Stempel Foundation, Mr. and Mrs. Anthony Jonklaas of the Kenridge Fund, and the Bermuda Government Department of Conservation Services. Thanks are due to Dr. Sarah Manuel and Anson Nash of the Department of Conservation Services Applied Ecology Unit and also to Evan Outerbridge for providing technical assistance in the field, as well as to Dr. Brian Luckhurst and Tammy Trott at the Department of Environmental Protection for granting access to their laboratory.



# reproductive cycles of Bermuda's endemic killifishes

Mark Outerbridge† and Anne F. Glasspool\*

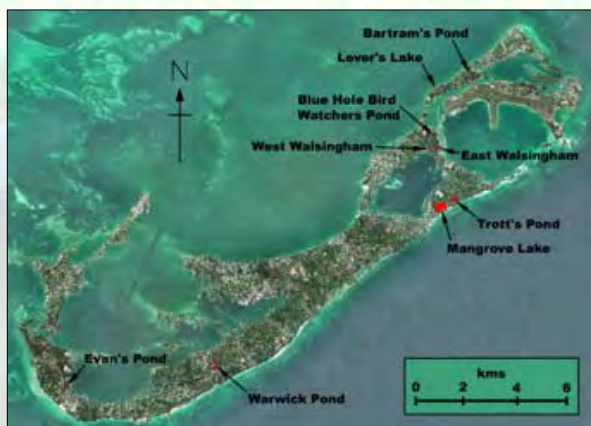
† Box FL 145, Flatts, FL BX, Bermuda. E-mail: [mouterbridge@gov.bm](mailto:mouterbridge@gov.bm)

\* University College Cork, Distillery Fields, North Mall, Cork, Ireland

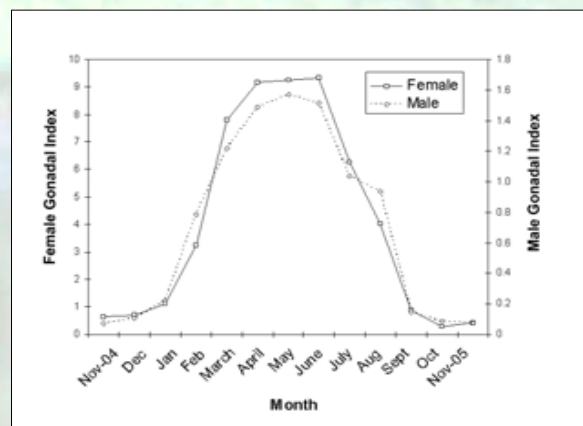
**Table 1.** Population assessments for *Fundulids* in Bermuda

Pond	Area (ha)	Size range TL (mm)	Mean Length TL (mm)	Female:Male ratio	Estimated population	Fundulus species
Mangrove Lake	12.27	52 – 126	71.9	1.17:1	15,200 (+/-2,220)	<i>F. bermudae</i>
Trott's Pond	3.85	36 – 100	61.5	1:1	9,528 (+/-2,538)	<i>F. bermudae</i>
Lover's Lake	0.50	41 – 97	63.0	1.08:1	9,194 (+/-1,647)	<i>F. relictus</i>
Blue Hole Bird Watchers Pond	0.12	34 – 97	55.0	1.78:1	6,706 (+/-1,272)	<i>F. bermudae</i>
West Walsingham Ponds	0.20	27 - 72	48.3	1.86:1	2,237 (+/-173)	<i>F. bermudae</i>
Bartram's Pond	0.40	38 – 92	53.8	2.06:1	1,808 (+/-616)	<i>F. relictus</i>
Warwick Pond	1.62	41 – 129	77.1	1.21:1	617 (+/-56)	<i>F. bermudae</i>

\* Not included are Evan's Pond and the East Walsingham Ponds; fish could not be trapped in these two ponds.



**Fig.5** Distribution of killifishes across the islands of Bermuda



**Fig.6** Spawning cycle of killifish from Mangrove Lake



**Fig.7** Mangrove Lake

Photo by Mark Outerbridge

**Reproductive cycles:** Laboratory analysis of gonad development allowed for the description of the annual reproductive cycle of killifish from Mangrove Lake (Fig.7). A distinctive annual pattern was evident, with female and male cycles synchronous over the 13 month study period. The results indicate that these fish began their spawning season in winter and reached maximum reproductive output in early summer. Gonadal indices abruptly fell after June and continued to fall at a steady rate until September, marking the end of the spawning season. (Fig.6).

**Discussion:** The present distribution of Bermuda's *Fundulids* is substantially different from their former distribution. Historical records indicate that they were once abundant and widely distributed throughout many of the marshes and ponds of Bermuda, as well as the muddy bays around St. George's and St. David's in the mid 1800s and early 1900s (2,5,6). The survey results of the present investigation indicate that Bermuda's *Fundulus* species have completely disappeared from the coastal mangrove and the inland marsh communities. Human modification to historical killifish habitats is the single greatest reason why distribution is currently limited. Since Bermuda's killifish are now found in a few isolated populations, consideration has to be given to their viability in the short and long term. At least three populations are sufficiently low enough to be deemed vulnerable to extinction. The creation and restoration of wetland habitats, combined with transfer of killifish from the larger populations, is a sensible step forward to ensure the survival of these unique species.

#### Literature Cited:

- (1) Thomas, M.L.H., Eakins, K.E., Logan, A. & Mathers, S.M. (1992) Biotic characteristics of the anchialine ponds of Bermuda. *Bull. Mar. Sci.* 50(1), 133-157.
- (2) Smith-Vaniz, W.F., Collette, B.B., & Luckhurst, B.E. (1999) *Fishes of Bermuda: History, Zoogeography, Annotated Checklist, and Identification Keys*.
- (3) Able, K.W. & Felley, J.D. (1988) Bermuda *Fundulus* (Pisces: Fundulidae) revisited: taxonomy of the endemic forms. *Proceedings*, 140, 99.
- (4) Ricker, W.E. (1958) Handbook of computations for biological statistics of fish populations. *Fisheries Research Board of Canada. Bulletin* No. 119.
- (5) Hurd, J.L. (1897) *Rough notes and memoranda relating to the natural history of the Bermudas*.
- (6) Beebe, W. & Tee-Van, J. (1933) *Field book of the shore fishes of Bermuda and the West Indies*.

This is Contribution # 132, Bermuda Biodiversity Project (BBP), Bermuda Aquarium, Natural History Museum and Zoo

# Poster: Sustainability and the Ecosystem Approach

**Diana Mortimer, Joint Nature Conservation Committee**



Mortimer, D. 2007. Sustainability and the Ecosystem Approach. p 340 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The ecosystem approach is an exciting concept. Its application seeks to create a world where natural resources and people are both fully taken into account. It provides a framework against which to assess if a policy (e.g. sustainable development plans) or project (e.g. individual species projects) meets sustainability objectives.

The core concept of the approach lies in integrating and managing the range of demands we place on the environment, such that it can indefinitely support essential services and provide benefits for all without deterioration to the natural environment. Adopting this balanced approach enables people and their natural resource use to be placed squarely in the centre of decision making, allowing a more equitable and long-term future for all.

The Joint Nature Conservation Committee (JNCC) can provide advice on how to use the ecosystem approach to help implement environmental charters, requirements of multilateral environmental agreements and individual projects.

**Dr Diana Mortimer**, Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough, Cambs, PE1 1JY, UK. [diana.mortimer@jncc.gov.uk](mailto:diana.mortimer@jncc.gov.uk)



# Poster: Valuation and other economic tools for the Overseas Territories

**Emily McKenzie, Joint Nature Conservation Committee**



McKenzie E. 2007. Valuation and other economic tools for the Overseas Territories. p 341 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Many ecosystem services are undervalued by the market or ignored in policies. As a result, biodiversity is often under-priced, over-consumed and under-conserved. Environmental economics tools can be used to address these problems, by helping to: 1) understand the root causes of biodiversity loss; 2) estimate and communicate the value of biodiversity; 3) assess the costs, benefits and uncertainty of alternative development options; and, 4) develop incentives for biodiversity conservation and sustainable use. JNCC is developing guidelines on simple environmental economics tools for the Overseas Territories and other small island States and Territories.

**Emily McKenzie**, Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough, Cambs, PE1 1JY, UK. [emily.mckenzie@jncc.gov.uk](mailto:emily.mckenzie@jncc.gov.uk)

# Poster: Fragments of Paradise: Promoting Biodiversity Conservation in the UKOTs

## UK Overseas Territories Conservation Forum

UK Overseas Territories Conservation Forum 2007. Fragments of Paradise: Promoting Biodiversity Conservation in the UKOTs. p 342 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The Forum was established in 1986, as an unincorporated institution, when a number of UK-based science and conservation organisations recognised a previously unaddressed need to promote and coordinate conservation of the diverse and increasingly threatened plant and animal species and natural ecosystems in the UK Overseas Territories. UKOTCF became a charitable company in 1996. UKOTCF has assisted the establishment and development of locally based NGOs in the UKOTs, which are now strong members of the Forum.

The Forum display provides an introduction to the remarkable biodiversity of the UK Overseas Territories and the work of the UK Overseas Territories Conservation Forum and its member organisations. The Forum has helped local people to form conservation NGOs, and helps both these and governmental bodies develop their capacity to run themselves and manage projects, often jointly with UKOTCF and its other member organisations. It helps raise awareness about the wealth of biodiversity in UKOTs, both within the UK and the UKOTs. The display is a series of interpretation boards, three introductory boards and one each for fifteen of the individual UK Overseas Territories. Images based on the boards can be viewed on the UKOTCF web-site ([www.ukotcf.org](http://www.ukotcf.org)).

**UK Overseas Territories Conservation Forum**, 102 Broadway, Peterborough PE1 4DG, UK [pienkowski@cix.co.uk](mailto:pienkowski@cix.co.uk) [www.ukotcf.org](http://www.ukotcf.org)

# Poster: UK Overseas Territories Programme: current projects, activities and collaborations

Royal Botanic Gardens, Kew

Royal Botanic Gardens Kew 2007. UK Overseas Territories Programme: current projects, activities and collaborations. pp 343-350 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

Royal Botanic Gardens Kew, Herbarium, Richmond TW9 3AB, UK.  
[c.clubbe@kew.org](mailto:c.clubbe@kew.org)



## UK Overseas Territories Programme

Current projects, activities and collaborations

Raising awareness in the UK Overseas Territories



### Kew works at three levels with UKOTs:

- Strategically by providing policy advice to the Foreign Office, Department of Environment, Food and Rural Affairs, and the Department for International Development
- Technically by undertaking a wide range of conservation projects both at Kew and in Territory and providing opportunities for capacity building and institutional strengthening
- In an Advisory role to both Governments and NGOs in Territories on a whole range of conservation related activities

### Our approach to developing and implementing conservation projects with our in-territory partners:

- Document biodiversity – what plants are found there
- Assess the origin of these plants – native, endemic, introduced, invasive
- Determine the distribution of these plants and assess the main threats
- Undertake conservation assessments
- Produce Territory Red Lists
- Evaluate the conservation/management needs (often as part of developing a management plan)
- Evaluate local capacity to identify what training needs there are and how these can best be met.



Caribbean Region GSPC Workshop participants in Montserrat, 2006

### Project Work Supported by:

- Darwin Initiative:
  - British Virgin Islands
  - Anegada, British Virgin Islands
  - Montserrat
  - Cayman Islands
- Overseas Territories Environment Programme:
  - Montserrat
  - Turks and Caicos Islands
- Kew
  - St Helena
  - Ascension
  - British Virgin Islands

# British Virgin Islands

## Assessment of the Coastal Biodiversity of Anegada, BVI

Kew has been working closely with the BVI National Parks Trust (NPT) and the local community to build capacity and raise awareness about Anegada's unique biodiversity and the threats it faces. Through this work many significant conservation outputs have been achieved including a Vegetation Map of Anegada and a Red List of the flora.



Darwin Team members with local school group in the field

Other achievements of the project:

- a herbarium specimens collecting programme and a herbarium to house a national reference collection at the J.R. O'Neal Botanic Garden on Tortola
- a seed collecting programme and a long term seed storage unit at the J.R. O'Neal Botanic Garden
- development of botanical skills by providing training workshops and field experience



Kew and BVI NPT staff in the field



J.R. O'Neal Botanic Garden on Tortola

Kew has provided on-going support for the nursery facilities at the J.R. O'Neal Botanic Garden on Tortola. The science nursery area now holds 10 threatened species in *ex situ* collection. All garden staff have undertaken training in a range of horticultural topics.



Kew staff providing training in orchid propagation to J.R. O'Neal Botanic Garden Staff



# Montserrat

## Enabling the People of Montserrat to Conserve the Centre Hills

The volcanic eruptions of 1995-97 destroyed almost all the forests of the southern hill ranges resulting in the total loss of about 60% of Montserrat's forest ecosystem. The Centre Hills now hold the largest intact forest area remaining on the island. It is the last viable enclave for most of the island's wildlife. This highly collaborative three year Darwin project is undertaking a biodiversity assessment of the Centre Hills, researching the impact of alien invasive species on forest ecology and producing a Management Plan.



*Rondeletia buxifolia* is endemic to Montserrat



*Epidendrum montserratense* is endemic to Montserrat

Before the start of the project, little was known of the plant composition of the Centre Hills. Our work has already increased the number of plant species recorded for the island, and we have re-discovered one of Montserrat's endemic shrubs, *Rondeletia buxifolia* in the family Rubiaceae.

We are producing a Montserrat Vegetation Map, a Conservation Checklist for the flora of the Centre Hills and a Conservation Checklist and Red List for the whole island.



Kew staff collecting herbarium specimens in the Centre Hills



Kew staff using mobile technology for field data collection



Kew and Darwin Project Staff in the field with GIS maps



# Turks and Caicos Islands

Kew have been active in TCI through the work of the UK Overseas Territories Conservation Forum. Currently, we are working on a Red List of TCI plants. Our collaboration with the TC National Trust (TCNT) has found the endemic variety of Caribbean Pine, *Pinus caribaea* var. *bahamensis*, to be infested with a non-native scale insect. We are currently seeking funding to establish a project to help protect the pine.

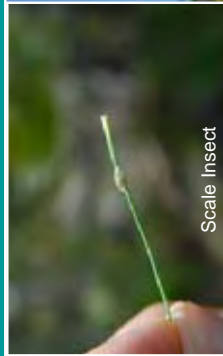


TCNT staff collecting herbarium specimens for red list project



Staff from Kew and TCNT working together to collect seeds of restricted range plant species

TCI have started a seed collecting programme through training provided by the Millennium Seed Bank Project (MSBP). Resulting seedlings will be added to the conservation collections at Kew. In time, cultivation protocols will be provided for the Territory so that the TCNT can grow native plants for use at sites under their management for landscaping or *in-situ* conservation.



Scale Insect



Kew staff using mobile technology to record scale infestations



MSBP staff training TCNT staff in herbarium voucher specimen collection



# Cayman Islands

## In Ivan's Wake: Darwin Initiative BAP for the Cayman Islands

The Darwin Initiative project aims to draw together local and international expertise with the goal of developing a Biodiversity Action Plan for the Cayman Islands - protecting terrestrial and marine life and their habitats.



Devastation after Hurricane Ivan

Land clearance for development and the devastating effects of Hurricane Ivan have opened many new areas of land for invasion by alien species. Recording and mapping these non-native aliens and developing strategies for dealing with them are important components of the Darwin Project.

Other botanical activities underway are:

- formation of a botanical stakeholders group
- initiation of a seed collecting programme
- publication of two key reference works: a second edition of the *Flora of the Cayman Islands*, and a *Red List for the Cayman Islands*.



Conservationists examine the endemic palm, *Coccolthrinax practorii*



Queen Elizabeth II Botanic Park (QEII BP)



QEII BP staff have successfully propagated the endemic shrub *Pisonia margaritae*

A native plant nursery has been established at QEII BP to encourage use of native species in landscaping and reduce the use of potentially invasive imported species. Seeds of 40% of the initial target of 20 species have been collected and established.



*Scaevola sericea* is a highly invasive alien species of coastal habitats

## Ex Situ Conservation Collections of UK Overseas Territories Species

The overall goals of the programme is to secure threatened species in *ex situ* cultivation, to develop recovery programmes as required, and to train project partners in threatened species management.



*Acacia anegadensis*

Inset: Staff looking after BVI endemic plants in Kew's Tropical Nursery

An on-going project has propagated *Trochetiopsis ebenus* and *T. erythroxylon*, two Critically Endangered trees from St. Helena, using traditional and novel methods.

- Kew's Micropropagation Unit undertook work to increase the collections of these tree species.
- Plants grown in agar-based cultures proved unsuitable for transplantation due to a poorly developed root system.
- The team trialed two novel supporting materials and is now able to produce healthy plants.

One project has focused on the Critically Endangered, single island endemic, *Acacia anegadensis* from Anegada, BVI:

- Seeds from the Millennium Seed Bank Project were sown in the Tropical Nursery at Kew. A mirror project was undertaken at the J.R. O'Neal Botanic Garden in BVI.
- Resulting seedlings were trialled in different media types and climatic zones.
- Our findings are now being compiled and a protocol will be provided to the BVI.



Staff looking after St Helena endemic plants in Kew's Tropical Nursery  
Inset: micropropagation of *T. ebenus*



UK OVERSEAS TERRITORIES



CONSERVATION FORUM

## Current partners and funders of Kew's UKOTs Programme



# Book launch: Important Bird Areas in the UK Overseas Territories

**Sarah Sanders and Geoff Hilton, RSPB**

Sanders, S. & Hilton, G. 2007. Important Bird Areas in the UK Overseas Territories. pp 351-352 in *Biodiversity That Matters: a conference on conservation in UK Overseas Territories and other small island communities, Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006* (ed. M. Pienkowski). UK Overseas Territories Conservation Forum, [www.ukotcf.org](http://www.ukotcf.org)

The BirdLife Important Bird Area Programme is a worldwide programme that identifies sites of global biodiversity importance using internationally agreed and scientifically objective criteria. Across the UK Overseas Territories, 78 Important Bird Areas have been selected. Apart from birds, experience from elsewhere shows that Important Bird Area sites form an effective network for protecting wider biodiversity.

What next?

Although the process has identified priority sites for conservation action this is only the first step. At each of these sites we would like to see:

- Development of site management plans
- Action to conserve biodiversity
- Increased allocation of resources for conservation
- Regular monitoring and reporting on the status of sites
- Protected Area designation given to sites
- Policy makers taking IBA sites into account when making strategic development decisions

How?

There is no single approach that will apply to all IBAs – depending on the Territory some actions will be more applicable than others.

- Identify a national IBA co-ordinator
- Raise the profile of the IBA programme within Territories
- Establish 'Site Support Groups' of local stakeholders to monitor and champion sites
- Develop relationships with UK and UKOT government institutions so IBAs are designated as Protected Areas and resources are allocated for better management
- Set up an IBA monitoring system so we know what is happening at sites
- Provide relevant IBA monitoring data to UK and UKOT government institutions (helping them to meet reporting obligations under international conventions)
- Engage in regional BirdLife networks to share experiences

Who?

As resources are often limited on the UKOTs, to take the programme forward will require support from NGOs, Government and local communities.

More information: [www.birdlife.org](http://www.birdlife.org)

**Sarah Sanders**, Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 3JH, UK. [sarah.sanders@rspb.org.uk](mailto:sarah.sanders@rspb.org.uk); **Dr Geoff Hilton**, RSPB, c/o Sociedade Portuguesa para o Estudo das Aves (SPEA), Rua da Vitória nº 53, 3º Esq., 1100-618 Lisboa, Portugal. [geoff.Hilton@rspb.org.uk](mailto:geoff.Hilton@rspb.org.uk)



*Above: Those authors and editors of Important Bird Areas in the United Kingdom Overseas Territories: Priority sites for conservation present at the conference gather for the book's launch.*

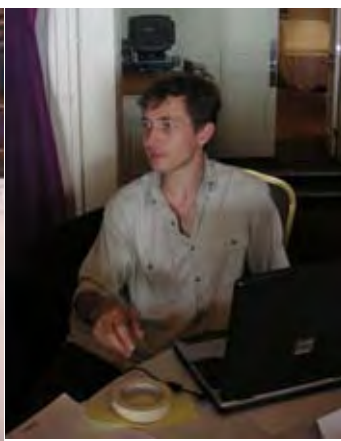
*Below: Exploratory meeting leading to the creation of UKOTCF's Europe Territories Working Group*





## Appendix 1: Workshop on Biodiversity and Impact Assessment in Small Island States

**Facilitators: Dr Jo Treweek** (Technical Programme Manager for a ‘Capacity Building for Biodiversity and Impact Assessment’ project), **Dr Bill Phillips** (Director of MainStream Environmental Consulting and the former Deputy Secretary General of the Ramsar Convention on Wetlands, 1997-2000) and **Jeremy Barker**



It is impossible to include in these Proceedings the full benefits of the Workshop. However, both to act as an aide-memoire for those present and to make available a little of the valuable information to those who could not be, a small proportion of the presentations are included here. These are just in the form of the slides, rather than as all the texts and the discussions, but we hope that they give some flavour.

The background to the Workshop is included in Appendix 2, and the Conclusions and Recommendations from the workshop are included in the Introductory section of these proceedings.



# Introduction to Workshop




**Biodiversity and Impact Assessment in Small Island States**

6<sup>th</sup> – 7<sup>th</sup> October 2006  
Jersey

Facilitators  
Jo Treweek  
Bill Phillips  
Jeremy Barker



Capacity Building in Biodiversity and Impact Assessment



- ❖ Introduction to tools and techniques for getting biodiversity into impact assessment
- ❖ Economic evaluation tools for assessing impacts on biodiversity
- ❖ Approaches to mitigation of biodiversity related impacts
- ❖ The concept of biodiversity offsets and case studies demonstrating applications of offsets

## CBBIA-IAIA: Promoting biodiversity-inclusive impact assessment



Promoting biodiversity-inclusive impact assessment



### Aim

To develop and promote Impact Assessment (EIA and SEA) as an effective instrument for addressing biodiversity considerations in decision making and the execution of projects, programmes, plans and policies.



### Objectives

- Provide practical, demand-driven support for development of capacity
- Share information and experiences, working with practitioners, policy-makers, biodiversity-related conventions and other stakeholders to build expertise and promote good practice
- Support capacity-building through knowledge-transfer, institution-building and networking
- Support the work of the biodiversity-related Conventions
- Promote, and contribute to, the further development of guidelines for incorporating biodiversity related issues into IA.



### Activities

- Conferences, events, training and workshops
- Working with institutions, organisations and individuals in selected regions and countries to enhance integration of biodiversity with IA laws, procedures and practices
- Small grants for review and enabling activities
- Database of contacts and mechanism for ongoing exchange of information and ideas
- Further development of guidelines on the integration of biodiversity considerations in EIA and SEA within the framework of the Convention on Biological Diversity, the Ramsar Convention and the CMS



### Outputs

- A network of trained professionals
- Capacity-building activities eg workshops and training, based on needs assessment and review of current practice in participating regions and countries
- Guidance on biodiversity-inclusive EIA and SEA
- Tested training materials
- Case study material to support development of CBD and other guidance on EIA and SEA



### Regional Activities

Focal Regions:

- Southern Africa
- South/South East Asia
- Central/ South America
- Small Island States

1. Needs/ Situation Assessment,
2. Materials for regional capacity building and 'road-testing'
3. Meetings and workshops
4. Future funds



## CBBIA-IAIA Small Grants



- Support review and enabling activities primarily in countries outside main regions
- 2 rounds, 12 Projects completed
- Results of first round presented at IAIA '05 and IAIA '06



## CBBIA-IAIA Bursaries



Help suitably qualified individuals participate in IAIA conferences and events, including regional workshops and activities as well as annual conferences.

More than 100 people from 30 countries have benefited so far



## CBBIA-IAIA Partnerships



Working with:

- regional partners to implement workplans
- governments, organisations, and individuals to build capacity
- professionals to build expertise and knowledge
- Governments to strengthen laws and institutions
- Biodiversity-related Conventions (CBD, Ramsar, CMS) to promote 'biodiversity-inclusive impact assessment'
- Individuals and organisations at grass roots level who want to develop practical advice
- Students who want to learn more about biodiversity and impact assessment

CBBIA worked with the IAIA Biodiversity and Ecology Section to produce:

IAIA Principles and Practices Series:  
Biodiversity in Impact Assessment

Biodiversity and Impact Assessment: IAIA  
Key citations

Available from:

[www.iaia.org](http://www.iaia.org)

## CBBIA: Developing Guiding Principles

### **Precautionary principle**

presumption in favour of biodiversity protection where knowledge is lacking to ensure effective mitigation or where it is impossible to confirm 'no significant impact'.

[www.pprinciple.net/](http://www.pprinciple.net/) [www.iaia.org](http://www.iaia.org)

### **'No net loss' principle**

requires status quo to be maintained or enhanced in terms of quantitative and qualitative aspects of biodiversity in line with international agreements and obligations.

**'Ecosystem approach'**, advocated by CBD and Ramsar Convention to ensure sustainable use. Biodiversity depends on healthily functioning ecosystems and processes that have to be assessed and managed in an integrated way.

CBBIA provided case studies and experiences to support development of voluntary guidance on biodiversity-inclusive impact assessment, recently endorsed by the CBD. These highlighted challenges and opportunities associated with IA at both project and strategic levels

the CBD voluntary guidelines are available in 6 languages from:

<http://www.biodiv.org/doc/meeting.asp?lg=0&mtg=cop-08> (document number 44).

### **How do we overcome problems of under-valuation regarding biodiversity?**

- Although biodiversity yields many economically important goods and services, these values tend to be under-emphasised or ignored in decision-making
- It is difficult for EIA results to be fully incorporated into traditional economic measures of profitability
- Negative biodiversity impacts are not systematically reflected in project and programme appraisal and assessment measures
- There is seen to be little economic benefit to conserving biodiversity and few economic costs to biodiversity degradation and loss

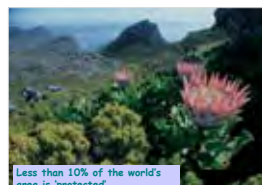
CBBIA participants have been exploring and developing techniques for economic valuation of biodiversity and for enhancing awareness of biodiversity values (and the costs of biodiversity damage and loss)



# Biodiversity and Impact Assessment in Small Islands



*"The most important lesson of the last ten years is that the objectives of the Convention on Biological Diversity will be impossible to meet until consideration of biodiversity is fully integrated into other sectors. The need to mainstream the conservation and sustainable use of biological resources across all sectors of the national economy, the society and the policy-making framework is a complex challenge at the heart of the Convention."* (Hague Ministerial Declaration from COP VI to WSSD, 2002)

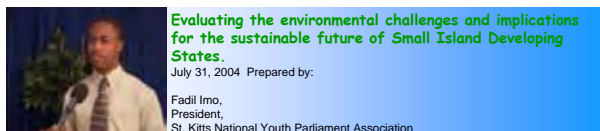


"Impact Assessment is an important mainstreaming tool, ensuring that biodiversity values are built into decision-making, from the strategic to the local level"



## Small islands are:

- HIGH IMPORTANCE
  - HIGH RISK
  - HIGH THREAT
- Environments



"I propose that SIDS apply their legislative power and control to demand that Environmental Impact Assessments (EIAs) be a compulsory component of all developmental projects and programs.

Simply put, EIAs are tools that assess potential and perceived environmental atrocities that may result from various projects such as the construction of buildings, seawalls, and drainage systems.

Two benefits of such a tool are that one, EIAs will provide governments and citizens of SIDS with the necessary information to weigh environmental costs against developmental goals which in turn will assist in better decision making and two, it allows for the development of proactive environmental protection schemes while projects are in the planning stages. Consequently, SIDS will have nothing to lose by analyzing the results of an EIA."

## Small islands tend to have:

- rich biodiversity with very high levels of endemism.
- low assimilative and carrying capacity, leading to problems with water production and storage and waste management.
- A relatively large coastal zone in relation to land mass resulting in high vulnerability to erosion.
- High vulnerability to loss of land associated with sea level rise
- Low resistance to outside influences, allowing rapid spread of invasive alien species and consequent endangering of endemic species.
- High incidence of natural disasters including earthquakes, volcanic eruptions, cyclones, hurricanes, floods, tidal waves..
- High threats from economic development, and mass tourism in particular.

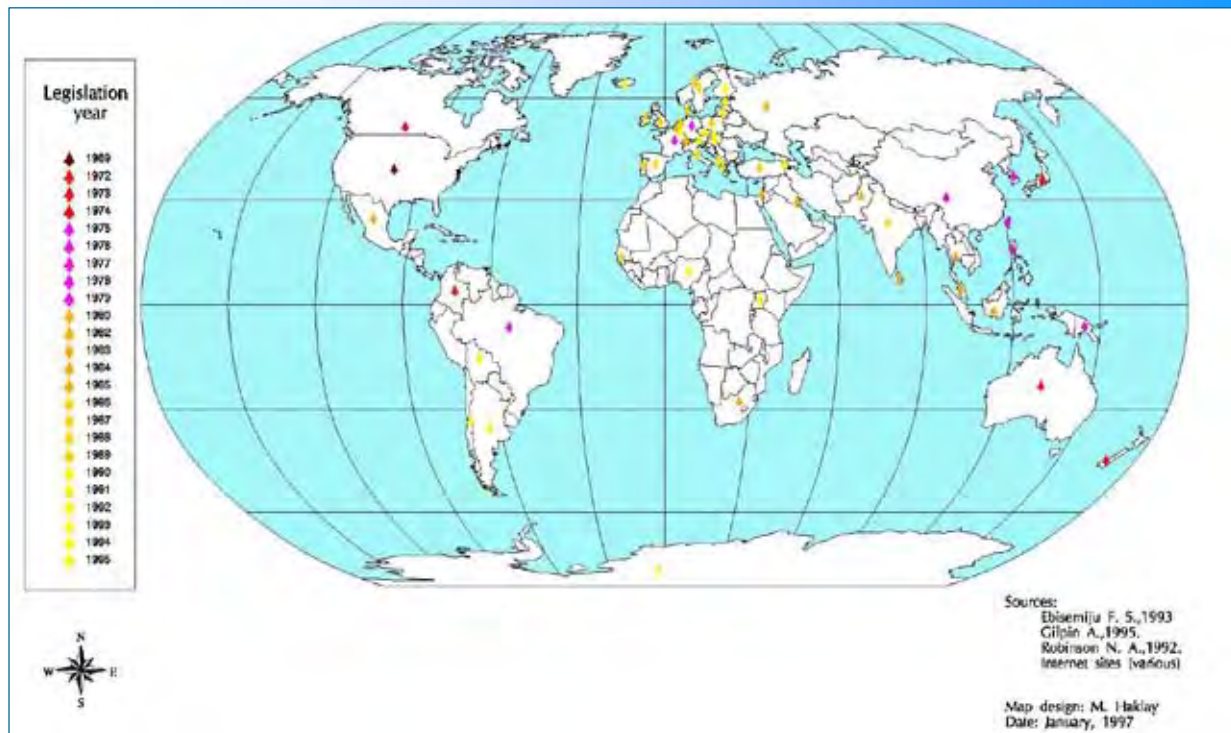


## From an international perspective..

- Biodiversity has buy-in as the ecological decision-making concept (ecology = understanding biodiversity)
- Global Biodiversity Conventions see Impact Assessment as a key tool
- EIA has wide but limited application
- SEA increasingly seen to be essential as a tool for mainstreaming biodiversity into development planning

Seek to obtain the best possible biodiversity outcomes from land use change

## EIA is widely applied: Countries by EIA Legislation Year



- ❖ EIA provisions now exist in the framework environmental legislation of 55 developing countries.
- ❖ At least 22 currently have specific laws, decrees or regulations, which contain criteria or procedures applicable to EIA.
- ❖ Environmental Assessment (EA) applies to all World Bank lending operations through its environmental and social 'safeguard policies'. (Operational Policy OP4.01/ Bank Procedure BP4.01 on Environmental Assessment)



Is Impact Assessment the best tool for biodiversity?....



Do EIA reports make a difference?

### Impact Assessment Trends

- EIA is a mandatory legal requirement in many countries.
- Understanding of the EIA process is generally good, but implementation is poor with respect to biodiversity.
- Lack of awareness of biodiversity importance among decision makers
- Insufficient information/baseline understanding to predict impacts reliably
- Lack of taxonomic expertise
- Poor involvement of affected people and other key stakeholders
- Little effort to evaluate significance or interpret results
- Little consideration of ecosystem scale, indirect or cumulative impacts
- Little consideration of uncertainty, risk, gaps in information
- Ever widening gap between demand and supply of ecosystem goods and services

### Capacity



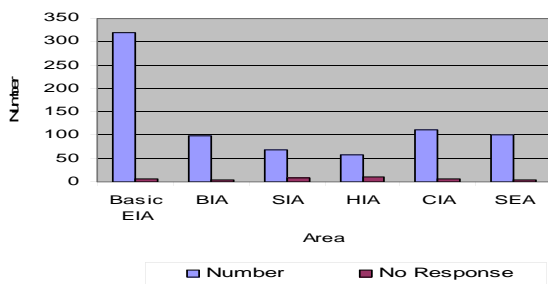
Limited institutional capacities of authorities responsible for EIAs commonly results in inadequate implementation of the regulations.

As a result there is inadequate control over development, and little monitoring of project impacts. Public participation is also minimal, despite this being a requirement of existing legislation.



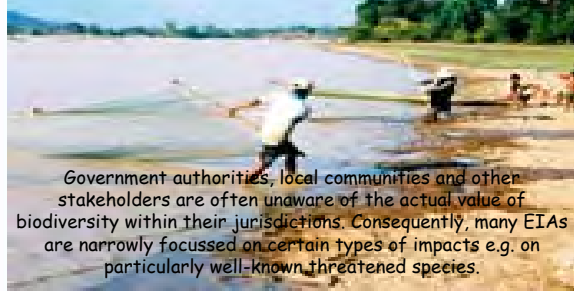
## Needs in Nepal:

Training Needed



## Awareness of biodiversity importance and values

The Millennium Assessment highlighted the vital role of biodiversity in its contribution to important ecosystem services and the benefits that people obtain from ecosystems).



Government authorities, local communities and other stakeholders are often unaware of the actual value of biodiversity within their jurisdictions. Consequently, many EIAs are narrowly focussed on certain types of impacts e.g. on particularly well-known threatened species.

(Millennium Ecosystem Assessment 2005. *Ecosystems and human well-being: Biodiversity synthesis*. World Resources Institute, Washington, D.C.)

## Information

Lack of reliable information on biodiversity makes it difficult to identify particularly valuable biodiversity components and ecosystem services that need to be considered in EIAs. Even if such values and services are known there is often inadequate information available to assess their status (i.e. establish baseline conditions) and reliably predict and quantify the likely impacts of proposed developments on them.



[www.qbif.org](http://www.qbif.org)

## Listings and designation procedures lag behind rates of loss



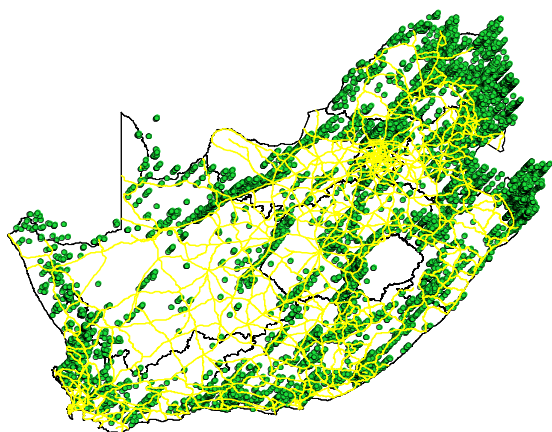
## Transparency and participation



Illegal and unregulated activities can represent the most serious threats

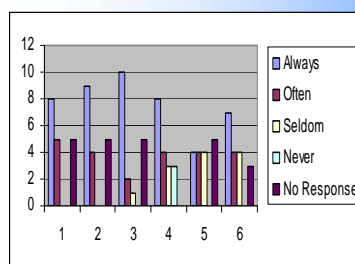




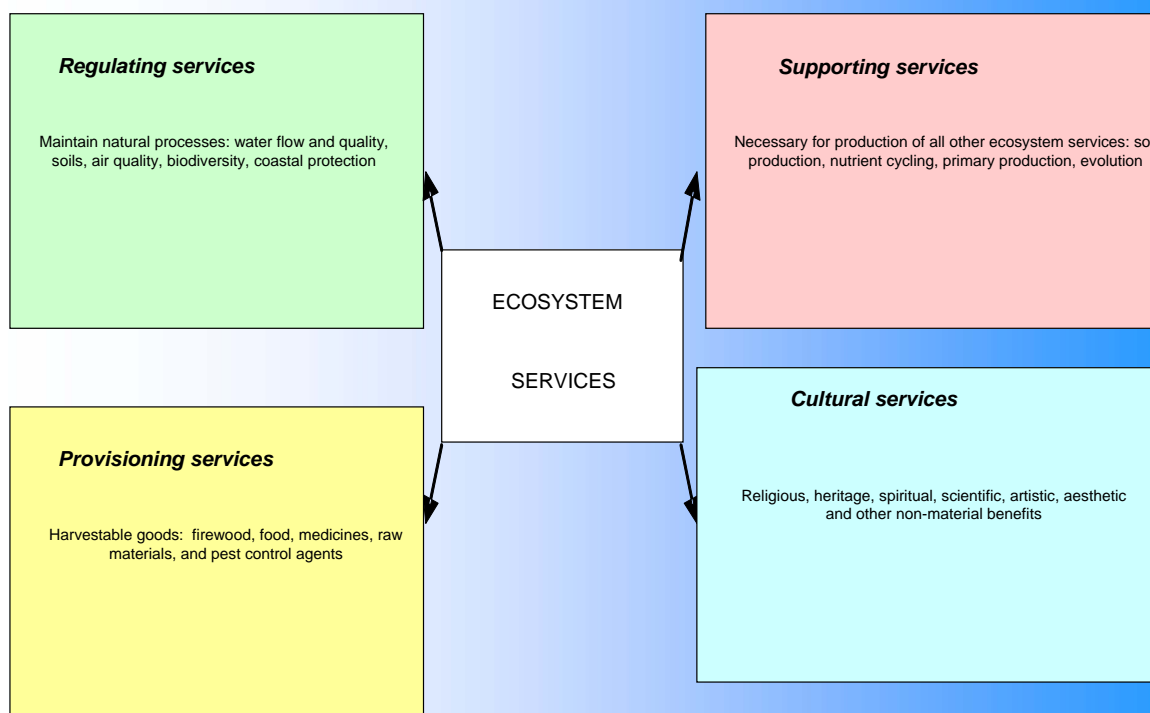


Scarab distribution data

## Nepal - biodiversity impacts considered in decision-making



1. Impacts on Red List or Red Data Book species
2. Impacts on protected species
3. Impacts on protected areas
4. Impacts on threatened or sensitive ecosystems/environments
5. Impacts of invasive species
6. Issues raised by key stakeholders about important ecosystem services that could be affected



## Key Trends in SEA Development

(Source: Dalal-Clayton and Sadler, 2005)

- SEA: assessing the environmental and sustainability effects of policies, plans and programmes.
- SEA is better developed at the level of plans and programmes than for policy and legislation.
- SEA development in developing countries is being catalyzed through the activities of international assistance and lending agencies, particularly the World Bank.
- Results of recent work of the Organization of the Economic Co-operation and Development's Development Assistance Committee (OECD/ DAC) Task Team on SEA now available.
- Many countries now have SEA arrangements in place but only a few implement them and very few have in-depth experience.

Many processes that reduce genetic diversity - e.g. loss or isolation of habitats - operate at the ecosystem, landscape or global scale: SEA is one way to capture these processes as well as more local ones.



Greenbelt at West Oxford, © Getmapping

IA is not always applied when it should be at project level. It is too late to develop viable alternatives or to confirm implications for biodiversity



## Insight's conclusions



- Biodiversity presents a **significant risk and opportunity to business** in several sectors.
- A new “**social contract**” is emerging: **access to land and sea conditional on best biodiversity practice.**
- **Best practice** will come to mean “**no net loss**”, as a minimum.
- There is a **business case for companies to:**
  - specifically offset the unavoidable harm they cause to biodiversity for new projects in areas of high biodiversity value
  - contribute to conservation activities to demonstrate a positive contribution

28

## C.....VAL CORP &plc

Environmental Policy:

- Core values include preserving the marine environment and .. the pristine condition of the waters upon which our vessels sail
- Commitment to pollution prevention, regulatory compliance and continuous improvement of environmental management

CR reporting focuses on regulatory compliance and 'end of pipe' solutions

## Ecosystem change in Southern Africa

- About 60% of ecosystem services degraded or used unsustainably.
- Increased risk of unpredictable (non-linear) and irreversible changes to ecosystems
- Harmful effects and costs borne disproportionately by the poor, contributing to growing inequities and disparities across groups and causing conflict.
- Condition and management of ecosystem services is a dominant factor influencing prospects for reducing poverty.

# The Ramsar Convention on Wetlands and Impact Assessment

Ramsar & impact assessment 1

## The Ramsar Convention and impact assessment


Dr Nick Davidson  
Deputy Secretary General, Ramsar Convention

Nick Davidson

Ramsar & impact assessment 2

### Presentation structure:

- What is the Ramsar Convention?
- A short history of Ramsar and impact assessment
- Ramsar and CBD links
- How well is IA being applied to wetlands?
- Future collaboration and work



Ramsar & impact assessment 3

### What is the Convention on Wetlands?

- Oldest of the global environmental conventions
- the only global convention focussing attention on an ecosystem (wetlands)
- covers very wide range of wetlands - from coral reefs to mountains

#### Why the "Ramsar" Convention?

- Ramsar, Iran - where Convention agreed 2 February 1971 by 18 countries
- XX so **not** an acronym (RAMSAR) XX
- Celebrated annually on *World Wetlands Day* - 2 February

Nick Davidson

Ramsar & impact assessment 4

### Ramsar's Mission

"The conservation and wise use of wetlands through local, regional and national actions and international cooperation as a contribution towards achieving sustainable development throughout the world."


(Strategic Plan 2003-2008)

Nick Davidson

Ramsar & impact assessment 5

### What is the "wise use" of wetlands?

- "... "Wise use of wetlands is the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development."



(Ramsar COP9, 2005)  
*Resolution IX.1 Annex A*

Nick Davidson

Ramsar & impact assessment 6

### Ramsar covers:

- Natural and human-made wetlands
- inland/freshwater:
  - marshes, rivers, lakes, reservoirs etc.
- coastal/marine
  - Mangroves, lagoons, estuaries, coral reefs, seagrass beds etc.
- above ground and underground
  - karst and caves
- but not deep oceans

Nick Davidson

Ramsar & impact assessment 7

### Ramsar Contracting Parties



Contracting Parties commit to delivering the Convention through 3 "pillars":

- Wise use of all wetlands
- Wetlands of International Importance - designation and management
- International cooperation

Nick Davidson

Ramsar & impact assessment 8

### The Ramsar Convention today

- 152 Contracting Parties
  - others in process of joining (accession)
  - from Africa, central Asia, Caribbean, Oceania
- Over 1600 Wetlands of International Importance - "Ramsar sites"
  - totaling >120 million hectares
  - size: from <1 ha to >6 million ha

Nick Davidson



## Ramsar links with other organisations

### Cooperation with:

- NGOs and expert networks
- regional environmental organisations
- UN agencies
- other environmental conventions
  - Joint Work Plan with CBD
  - joint activities developing with UNCCD, CMS, UNFCCC, UNESCO, MAB etc.

Nick Davidson

## Some key features of the Ramsar Convention

- Not under the UN system - governed by its Parties
- recognises wetlands (goods and services) as vital for human wellbeing (food and water security) and biodiversity conservation
- supports practical wetland sustainable utilization by countries
- open, collaborative and flexible mechanisms
  - both ecosystems and species
  - both sites and broad-based sustainable use
- supports implementation - not a "compliance-based" convention
- provides practical guidance on many topics - prepared by the STRP & its collaborators

Nick Davidson

## The Ramsar "tool-kit" - wise use handbooks



- 14 Handbooks - published 2004
- bring together:
  - Guidelines: COP7 & earlier COPs
  - relevant COP Resolutions and Recommendations
  - case studies
- New 3<sup>rd</sup> edition in preparation
  - include COP9 guidance
  - Update and replace some Handbooks

Nick Davidson

## A short history of Ramsar and impact assessment

- Key basis - Article 3 of Convention text

### Article 3.1:

"Contracting Parties [countries] shall formulate and implement their planning so as to promote the conservation of wetlands, including those on the List [i.e. Ramsar sites], and as far as possible the wise use of wetlands in their territory."

### Article 3.2:

"CP shall arrange to be informed at the earliest possible time if the ecological character of any Ramsar site has changed, is changing or is likely to change as the result of technological developments, pollution or other human intervention."

Nick Davidson

## A short history of Ramsar and impact assessment

- Implicit in Art. 3.2 is to use IA to predict likely change, and to respond to its findings to deliver Article 3.1 commitments
- This link only made explicit by Parties at COP8 (2002)



Nick Davidson

## A short history of Ramsar and impact assessment

- Role of EIA recognised as early as COP1 (1981) - Recommendation 1.6
- Many EIA decisions since:
  - 1987 Recommendation 3.3
  - 1990 Recommendation 4.10
  - 1993 Resolution 5.6
  - 1999 Resolution VII.16
  - 2002 Resolution VIII.9

Nick Davidson

## Ramsar's Strategic Plan 1997-2002

### Adopted 1996:

- stressed importance of IA
- requested expansion of wise use guidance - information on environmental assessment guidelines and good practice
- take particular account of EIA and SEA when assessing impacts
- reaffirmed IA as a key Convention tool
- recognised importance of including IA as cross-cutting issue in CBD/Ramsar Joint Work Plan (JWP)

2nd Strategic Plan (2003-2008) continues IA importance

Nick Davidson

## Ramsar and CBD collaboration

- since 1996 (CBD COP3) Ramsar identified as lead implementation partner of CBD on wetlands
- delivered through Joint Work Plans
  - now implementing 3rd JWP (2002-2006)
  - covers thematic ecosystem themes and cross-cutting issues incl. IA
- Ramsar Scientific & Technical Review Panel (STRP) and COP8 (2002) recognised the CBD COP6 IA guidelines as fully applicable to wetlands
  - adopted and use urged - with annotations for the Ramsar context
- IAIA is the key expert link between Ramsar and CBD work

Nick Davidson

## Ramsar and IAIA

- IAIA invited to contribute expertise to STRP's work since 1999 & 2006-2008 work plan
- formalised through 2001 MoC between IAIA and Ramsar Bureau
- COP8 & COP9 (2005) formally appointed IAIA as STRP observer organisation

Nick Davidson

## 1999 expectations of IA implementation

Resolution VII.16: *The Ramsar Convention and impact assessment: strategic, environmental and social*

- Parties to strengthen efforts to make sure potentially damaging developments to wetlands are subject to rigorous IA procedures
- Parties to ensure IA process is transparent and participatory - including local stakeholders

Nick Davidson

## How well are Ramsar Parties applying IA?

COP8 National implementation Reports (130 countries)

Globally:

- 75 countries (63%) - EIA required for any action which can potentially affect any wetland
- 33 countries (25%) - EIA required for some wetlands (e.g. Ramsar sites) only
- in total 91% - some wetland EIA activity required

Nick Davidson

## How well are Ramsar Parties applying IA?

Regional differences:

- **Asia:** no EIAs for wetlands in 52% of countries
- **Neotropics:** 65% have legislation requiring EIA for all wetlands, but
  - only 40% have actually carried out EIAs for threats to Ramsar sites
- **Mediterranean Basin countries:** only 29% have undertaken EIAs for all cases for Ramsar sites
  - although 69% require it
- **Africa:** 82% countries EIAs required - but little information on extent of application

Nick Davidson

## How well are Ramsar Parties applying IA?

### • Europe

- Only 48% countries require EIA for all cases of risk of change of ecological character of Ramsar sites

Ramsar Europe Regional Coordinator, noting no progress in the previous 3 years:

*"It is difficult to understand why every Ramsar site where proposed developments are likely to affect its ecological character still does not benefit from an EIA."*

*In some cases, a lack of political will to implement existing legislation is detectable."*

Nick Davidson

## How well are Ramsar Parties applying IA?

Conclusions?

- Legislative requirements widely in place *But*
- not being widely or consistently applied
- Countries need support and urging to do more EIA
  - benefit to both wetlands and IA practitioners!

Nick Davidson

## Latest decisions: Resolution VIII.9 (COP8, 2002)

Ramsar Parties to:

- make use of the CBD guidelines
- indicate their precise needs for further information, guidance and advice in IA relevant for wetlands
- provide relevant material
  - lessons learned, case studies, guidelines, advice sources etc.
- establish contact with relevant national focal points in IAIA networks
  - to identify sources of expertise and advice to assist in wetland IA

Nick Davidson

## Resolution VIII.9

Further guidance work - STRP to:

- report a synthesis of lessons learned from case studies
- identify current wetland-related guidelines, and investigate ways of filling gaps
- review existing IA references in Ramsar material, and correct any inconsistencies in approach
- prepare advice on SEA in context of other Ramsar guidelines

Nick Davidson



## Ramsar Wise Use Handbook 11 "Impact Assessment"

- ✓ Introduction to Impact assessment and Ramsar
- ✓ CBD 2002 guidelines for incorporating biodiversity into impact assessment
- ✓ Strategic Environmental Assessment
  - General approaches
- ✓ In English, French and Spanish
  - ✓ available mid-2004



Nick Davidson

## CBBIA project

- ✓ Will support enhanced capacity in countries to deliver Ramsar and CBD expectations for implementation
  - ✓ Through IAIA lead role supporting Ramsar on impact assessment
- ✓ will also develop some of the additional guidance and case studies/lessons learned requested by Ramsar COP8
- ✓ Ramsar Handbook 11 provides a resource material for project implementation

Nick Davidson

## Latest developments - 2005-2006

- Ramsar COP9 (Nov 2005) adopted further guidance on inventory & assessment, incl.
- **IF-WIAM**: integrated framework for wetland inventory, assessment & monitoring
  - Explains inter-relationship between different types and purposes of assessments
- Supported by Information Paper describing types of assessment
- Wetland Rapid Assessment Guidelines
  - Jointly with CBD
  - Published March 2006 as *CBD Technical Series 22* & *Ramsar Technical Report 1*

Nick Davidson

## Latest developments - IF-WIAM

- There is a wide range of different types and methods of wetland assessment relevant to different aspects of Convention implementation, with each suited to, and designed for, different purposes and situations. These include:
  - i) Environmental Impact Assessment (EIA)
  - ii) Strategic Environmental Assessment (SEA)
  - iii) Risk Assessment (RA)
  - iv) Vulnerability Assessment (VA)
  - v) Change (status and trends) assessment
  - vi) Species-specific assessment
  - vii) Indicator assessment
  - viii) Resource (ecosystem benefits/services) assessment
  - ix) Assessment of values of wetland benefits/services
  - x) Environmental water requirement (environmental flows) assessment

Nick Davidson

## IF-WIAM - how different assessments fit together



Nick Davidson



### Latest developments - 2006-2008

STRP finalising more assessment guidance:

- Vulnerability assessment
- Economic valuation of wetland services
- Environmental water requirements (environmental flows) assessment methods

Nick Davidson

### Latest developments - 2005-2006

- CBD COP8 (March 2006) adopted expanded EIA & SEA guidance
  - Replaces the earlier EIA guidelines
  - Ramsar STRP will be asked to review the new guidelines for their relevance to wetlands
  - Take to Ramsar COP10 (2008) for endorsement

Nick Davidson



# Environmental Impact Assessment process: general stages

## EIA Process: general stages

*EIA is an on-going process of review, negotiation and incremental decision-making, culminating in the essentially political action of making a final decision about whether or not the proposal is to proceed and under what conditions.*

- The EIA process has procedural stages which vary from country to country depending on legislation in place
- Different methods exist for undertaking each step

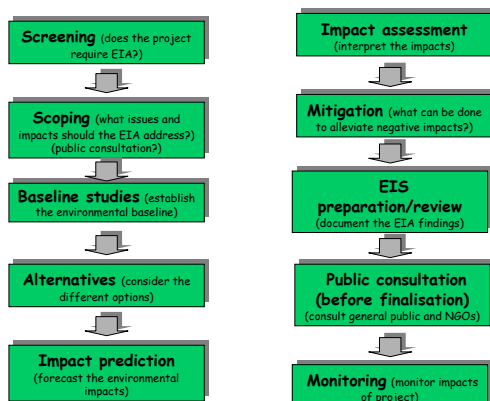
## 2 approaches to biodiversity/ EIA:

Science based...

- Understand the ecological dimension of the receiving environment (distributions, structure and function)
- Superimpose activities and predict a response within zone of influence
- Decide whether this is within limits of baseline variation
- Design mitigation to avoid/fix impacts
- Evaluate the ecological outcome with/without mitigation
- Finally consider whether anyone cares

Value-driven or objective-led..

- Understand distributions and needs of people and communities
- Identify and participate with people who need or use biodiversity/ ecosystem services
- Structure EIA around key values and services, possibly using objectives and indicators
- Consider main driving forces and whether key values can be sustained
- Design mitigation to maintain, restore or replace these values (offsets)



## Getting Biodiversity into IA

- **Impact Assessment:** Obtain data to quantify effects (consider: type, location, timing, frequency of activities and their ecological effects in terms of magnitude, range, duration).
- **Impact significance:** Are the predicted effects ecologically significant? Consider proportion of resource affected and reversibility. Will integrity or status be adversely affected?
- **Impact Mitigation:** Measures to avoid, reduce or remedy adverse impacts. What kind of biodiversity mitigation is possible or acceptable?
- **Monitoring and follow-up:** information, auditing of implementation, feed back

## Integrating biodiversity in EIA:

Analysis of change in biodiversity characteristics, richness and role

Pre project



Post project

**Composition of ecosystem** (biological diversity and richness)

**Structure** (spatio-temporal distribution of biodiversity resources)

**Functional aspects** (pollinator, top predator, food chain component..)

**Uses and values**

**Future consequence** (what happens if.....)



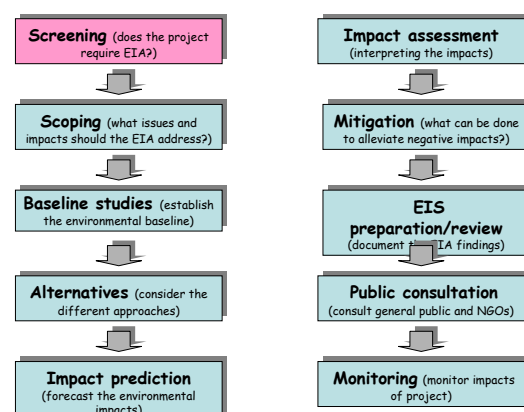
## Expected outputs of good EIA practice

### Positive planning 'hierarchy' for biodiversity:

- \* Enhance biodiversity
- \* Avoid impacts on biodiversity (no net loss of genetic variability, range, abundance).
- \* Minimise unavoidable impacts on biodiversity (no irreversible damage to ecosystem characteristics and functions).
- \* Ensure sustainable use of biological resources.

## Getting Biodiversity into IA

- **Screening:** Are there important ecological/ biodiversity-triggers for IA?
- **Scoping:** Which ecological aspects should be addressed and how? (consider spatial and temporal coincidence of proposal activities and the features/resources affected)
- **Refine TORs** on the basis of biodiversity values: consider importance of features and resources and people who might be affected.. Consider criteria which will be used in decision-making.



## Screening: is EIA required?

Different Approaches:

- ~ **positive and negative lists** (e.g. Philippines)
- ~ use of **thresholds**, definition of **environmentally sensitive** or **'critical' areas** (eg Malaysia)
- ~ **combinations** of the above (e.g. EU)

### Screening using listings:

**Category 1** – project not expected to result in any significant adverse impact on biodiversity resources (**No EIA required**)

**Category 2** – projects likely to cause significant adverse impacts unless appropriate mitigation taken (**EIA required**)

**Category 3** – projects likely to cause a range of significant adverse impacts with unknown magnitude demanding **detailed study/ EIA**

## Screening - using thresholds or criteria

Thresholds may be based on:

- ~ **characteristics of the development** (size, use of natural resources, processes, area of land required, risk of accidents)
- ~ **location of development** (existing land use, absorption capacity of natural environment, proximity to designated areas)
- ~ **characteristics of the potential impact** (eg level of emissions, likely extent - geographical area and size of affected population-)

### Screening thresholds: Malaysia

- *Environmental quality (prescribed activities) (environmental impact assessment) Order 1987* sets out 18 categories of projects with associated thresholds, including:
- For forestry projects:
  - conversion of hill forest land to other land use covering an area of 50 ha or more
  - Logging/ conversion of forest land to other use within the catchment area of reservoirs for municipal water supply, irrigation or hydro power generation or in areas adjacent to state and national parks and national marine parks
  - logging covering an area of 500 ha or more
  - Conversion of mangrove swamps for industrial, housing or agricultural use covering an area of 50 ha or more
  - clearing of mangrove swamps on islands adjacent to national marine parks

### Screening: thresholds EU

Description of development	Applicable thresholds and criteria
Intensive fish farming	The installation resulting from the development is designed to produce more than 10 tonnes of dead weight fish per year
Installations for hydroelectric energy production	The installation is designed to produce more than 0.5 megawatts
Motorway service areas	The area of development exceeds 0.5 hectare

From the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (S.I. No. 293)

### Screening - combination of methods

The UK uses a combination of **thresholds**; **positive and negative lists**, **case by case consideration**:

~ EIA is **mandatory** for **Schedule 1 \*** projects (**positive list**), eg installations for storage of petroleum, petrochemical or chemical products with a capacity of 200,000 tonnes or more

~ Certain projects are exempt from EIA (emergency works, national security) (**negative list**)

~ Other projects reviewed **case by case** and need for EIA depends on project size and environmental sensitivity (**thresholds**)

\* The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (S.I. No. 293)

- \* Consider information about the proposal and its potential impacts
- \* Review confidence in information and impacts
- \* Review characteristics of the environment and biodiversity at all relevant scales
- \* Planning, environmental management and decision-making framework
- \* Degree of public interest

"Triggers" for biodiversity inclusive impact assessment

Potential impacts on:

- \* PAs and other designated areas
- \* Areas supporting protected or listed species
- \* Areas supporting 'important' biodiversity
- \* Areas that provide important ecosystem services (flood defence, soil protection, groundwater re-charge, etc)

### Scoping: Establishing Terms of Reference

*Scoping should be carried out as a collaborative exercise involving the developer, the competent authority, relevant agencies and, ideally, the public*

#### Key agencies

- \* National government ministries (Mining, Agriculture, Health & Welfare, Water Resource, Forest & Environment, Industry etc.)
- \* Local government bodies
- \* Private sector organisation
- \* NGOs public
- \* **EIA experts**
- \* Local people

For biodiversity inclusive EIA, scoping should involve biodiversity experts and people dependent on biodiversity resources in the study area

A more pragmatic approach involves development of country guidance and translating the scoping outputs into ToRs.



## Scoping involves:

- Review of activities (extent, timing, duration etc)
- Review of biodiversity distributions, structure, function
- Review of baseline condition and likely responses and changes with & without project (preliminary impact assessment)
- Design of surveys or information gathering to 'capture' all relevant effects
- Explanation of proposed process and methods

### Key functional attributes and processes:

- \* **Nutrient cycles** (can effect system productivity and species composition)
- \* **Energy flow** (affects ability of systems to 'support' component species)
- \* **Productivity** (affects ecosystem function and species composition)
- \* **Eutrophication** (a form of increased productivity with implications for species composition)
- \* **Succession** (knowledge of patterns of succession is important for predicting community change over time)
- \* **Colonization** (can be a key in maintaining populations)
- \* **Dispersal** (can be key in maintaining populations and is also important with respect to ability to recover following impact)
- \* **Competition** (altered competition has implications for species composition and patterns of succession)
- \* **Assimilative capacity** (can affect ability of a system to absorb or recover from pollution)
- \* **Population processes** (breeding, migration)

(Source: Treweek, 1999)

### To focus the assessment using VECs, eg for species:

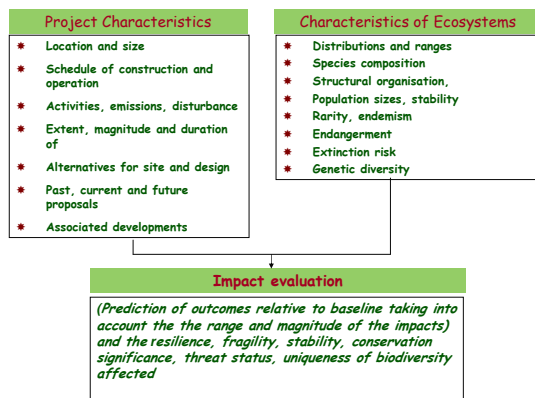
- \* Charismatic and emblematic species
- \* Economic importance
- \* Protected status
- \* Rarity
- \* Endangerment/conservation status
- \* Susceptibility and/or responsiveness to defined impacts (indicators)
- \* Umbrella species
- \* Important ecological role (e.g. position in food chain, keystone species)
- \* Availability of consistent survey methods
- \* Expediency/tractability for survey

### At some point it is necessary to define the 'baseline' against which future impacts can be assessed

- \* The baseline study should anticipate the future state of the environment assuming the project is not undertaken - the 'no action alternative'
- \* Baseline studies should be undertaken for each alternative (site) so that the implications of each alternative can be assessed
- \* New field based data are necessary (e.g. biodiversity survey) if information is not available, or is old and not relevant to the assessment

Although, many EIAs fail to consider alternatives, alternatives are really at the 'heart' of the EIA. Many EIA professionals consider them as essential 'raw material' of good EIA.

## Impact Assessment



## Biophysical changes

- \* Habitat loss or destruction (e.g.vegetation clearing)
- \* Altered abiotic/site factors (e.g. soil removal and compaction)
- \* Mortality of individuals (e.g. through collision)
- \* Loss of individuals through emigration (e.g. following destruction of habitat)
- \* Habitat fragmentation (e.g. barrier effect of road and pipeline)
- \* Disturbance (physiological and behavioural)

contd. ...

## Ecological impacts

- \* Mortality of individuals due to better access
- \* Reduced population (due to reduced habitat, size and quality)
- \* Altered population dynamics (due to altered resource availability)
- \* Increased competition (due to shrinking resources)
- \* Altered species composition and habitat changes (due to fragmentation)
- \* Reduced gene flow (due to restricted migration)
- \* Habitat isolation causing reduced breeding success
- \* Altered prey-predator relationships

## Cumulative impacts (time-and space-crowded effects)

- \* Habitat 'nibbling' (progressive loss and fragmentation throughout an area)
- \* Reduced habitat diversity, e.g. at the landscape level (associated with reduced biological diversity at other levels in organizational hierarchy)
- \* Habitat fragmentation over time, resulting in progressive isolation and reduced gene flow
- \* Reduced genetic diversity can result in loss of resilience to environmental change and increased risk of extinction
- \* Irreversible loss of biological diversity (e.g. through destruction of unique population units)

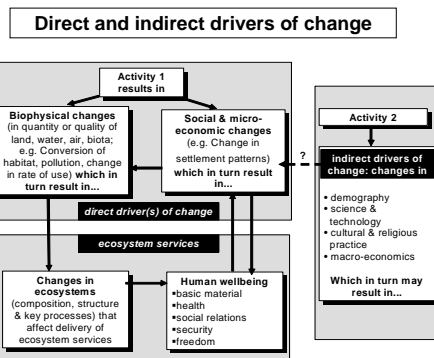
contd. ...

### Impact assessment:

involves evaluation of magnitude, extent and significance of environmental impacts

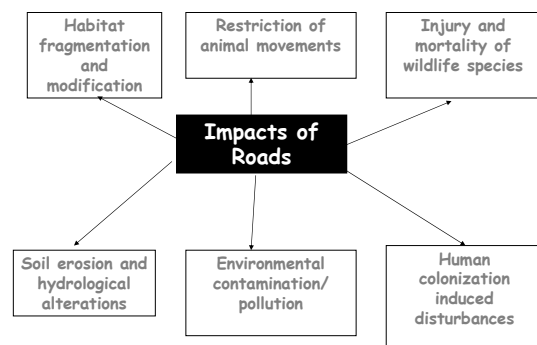
- \* Significance can be determined through professional judgement, reference to regulations and criteria evolved
- \* The conclusions of the impact assessment can ultimately be used by decision-makers when determining the fate of the project application

Impacts can vary in nature, magnitude, extent, timing, duration and reversibility



### Questions to ask when evaluating impact significance

- \* What impact will the project have on the genetic composition of each species?
- \* Do major systemic or population changes appear to be taking place?
- \* How will the proposal affect ecosystem processes? Is this proposal likely to make the ecosystem more vulnerable or susceptible to change?
- \* Does the proposal set a precedent for conversion to a more intensive level of use of the area?
- \* Is the biological resource in question at the limit of its range?
- \* Does the species demonstrate adaptability.
- \* What level of confidence or uncertainty can be assigned to interpretations of the effects?



Habitat Fragmentation and alteration, eg introduction of barriers



Restriction of animal movements

Injury and mortality of wildlife species



Soil erosion & hydrological change



Induced disturbance



pollution



### Examples of potential impacts of road on wildlife

Project characteristics/activity	Direct impacts	Indirect impacts	Cumulative/synergistic impacts
Clearing of vegetation	Loss or degradation of habitat	Reduction in habitat use	Decline in wildlife population and diversity
Increase in traffic volume	Increased road kills	Decline in populations	Change to trophic dynamics and species composition
Road alignment through wildlife habitat	Increased access to pristine wildlife habitat areas	Unplanned development Poaching	Decline in habitat quality Species decline
Land acquisition for road	Displacement of people	Colonization pressure in unsettled areas	Deterioration of previously undisturbed natural areas

## Animal mortality on roads in protected areas of India and Nepal (1997-1998)

Number of individuals killed per year	Wildlife habitats and the nature of roads on which mortality is reported					
	Tadoba Tiger Reserve	Sariska Tiger Reserve	Gir National and Park Sanctuary	Corbett Tiger Reserve	Pench Tiger Reserve	Royal Bardia National Park Nepal
	FR	SH	SH	SH	NH	NH
Chital		2	1			3
Sambar	3				1	
Nilgai		2	1			
Wild boar						
Lion			2			
Leopard			1	4		
Tiger		2		5	2	
Langur	17			37	1	
Civet	3				1	
Porcupine			1			
Barking deer						2
Mongoose	4				1	
Hyaena	2	1				
Jungle cat		1				1
Total road kills	29	8	6	46	6	6
Source	Dubey, 1997 <i>pers. comm.</i>	Johnsingh <i>et al.</i> 1998	Singh & Kamboj 1996	Uttar-anchal Forest Dept.	Areendran & Pasha 1999 <i>pers. comm.</i>	Karki & Shreshtha 1998 <i>pers. comm.</i>

### EIA is a part of the development control process and not research!

#### Basic characteristics of a good EIA:

- \* Balance - Complete, unbiased and practical
- \* Relevance- Development, location
- \* Significance - Focussed, Ignoring trifles and side issues
- \* Thoroughness- Quality of contents
- \* Clarity- To public and decision makers

#### Steps in reviewing an EIA report

- \* Set the scale of the review
- \* Select reviewer(s)
- \* Use public input
- \* Identify review criteria
- \* Carry out the review
- \* Determine remedial options
- \* Publish the review report

#### Range of review methods

- \* General checklists
- \* Project specific checklists
- \* Ad hoc processes
- \* Expert opinion, accredited reviewers
- \* Public review
- \* Panels of inquiry, independent commissions
- \* Legal approaches

### Main elements of an EA report

#### Executive summary

#### Main report

- \* Aims and objectives of the proposal
- \* Analysis of site selection and alternative sites
- \* Description of expected environmental conditions (biophysical and socio economic)
- \* Description of impacts Relationship to current land use policies
- \* Significance of impacts
- \* Evaluation of alternatives
- \* Impact management, mitigation plan
- \* Monitoring plans, contingency plan
- \* Terms of reference
- \* Appendices (glossary, explanation of acronyms, ToRs and a list of persons consultants for the study and documentation.



# Valuing biodiversity for impact assessment



## How do we overcome problems of biodiversity under-valuation?

- Although biodiversity yields economically important goods and services, these values tend to be under-emphasised or ignored in decision-making
- It is difficult to incorporate EIA results into traditional economic measures of profitability
- Negative biodiversity impacts are not systematically reflected in project and programme appraisal and assessment measures
- There is seen to be little economic benefit to conserving biodiversity and few economic costs to biodiversity degradation and loss

## THE BOTTOM LINE

Tourism in the small-island Caribbean accounts for a third of all trade, a fourth of foreign exchange earnings, and a fifth of all jobs

## BUT...

- multinational air, cruise and hotel interests often benefit over local communities
- Tourism's import discontinuities mean that short-run economic benefits often disguise cumulative longer run costs
- limited infrastructure and capacity can mean that ability to regulate impacts is restricted

Some typical environmental, economic and socio-cultural problems:

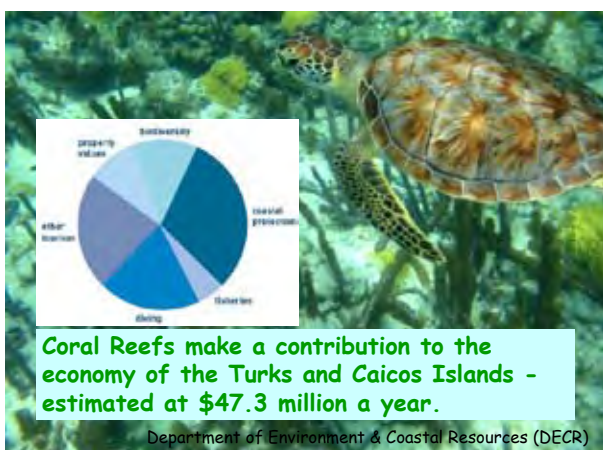
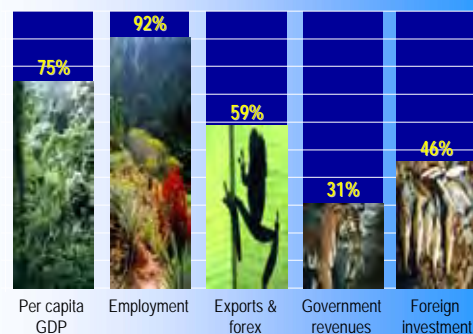
- infrastructural (water, electricity, etc.) capacity problems and disruptions (Jackson 1986),
- displacement of traditional economic activities (Johnson and Thomas 1996), import of labour when growth exceeds local labor supply (Kakazu 1994),
- real estate inflation,
- congestion and noise (Wall 1982),
- the increase in man-made attractions to replace lost natural amenities (Butler 1980),
- escalating crime, prostitution,
- steady erosion of cultural traditions, and
- the appearance of inauthentic cultural attractions (de Albuquerque and McElroy, 1995c; Pattullo, 1996).

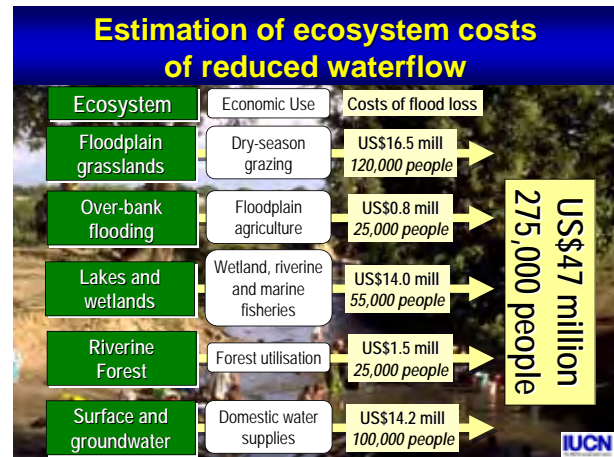
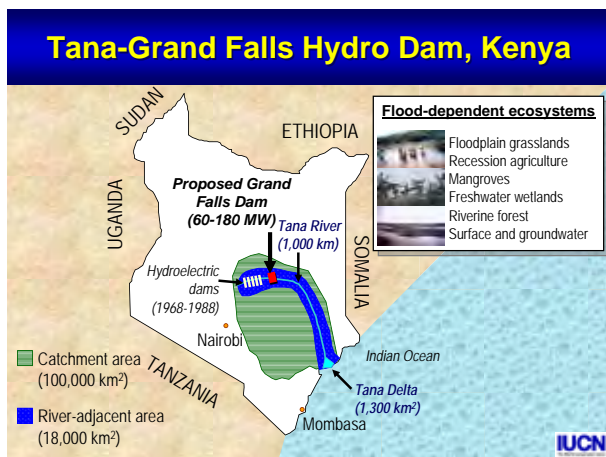


Large-scale transformational infrastructure and resort complexes concentrated along delicate coastlines result in:

- beach loss and lagoon pollution from sand mining, nearshore dredging, and hotel sewage dumping
- deforestation, introduction of IASs
- reef damage from diving, yacht and cruiseship anchoring and marina development
- filling-in of wetlands and mangrove destruction from resort construction

## Estimation of value of Lao PDR biodiversity to national economy





Value of wetland waste water treatment based on estimates of replacement costs for other technical options

- Replacement cost: upgrading coverage of piped sewerage supply, improving slum sanitation facilities, instituting industrial treatment processes **\$1 million**
- Mitigative expenditures: increased treatment costs for city water intake **\$1.75 million**
- Less costs of managing wetland for waste treatment **\$235,000**



You are about to board an aircraft, and you notice a man on a ladder busily popping rivets out of the wing. You approach him and ask what he's doing.

"I'm taking these rivets out of the wing," he replies.

"Why?"


"Growthmania Airlines, who own the plane, sell them for US\$1.00 each and I get US\$0.50 from them for each one I pop."

"Are you crazy? The wing will be weakened and sooner or later it'll fall off!"

"Don't worry, I've popped out a lot of rivets, and nothing has happened yet."

# Approaches to mitigation of biodiversity-related impacts

## Approaches to mitigation of biodiversity related impacts



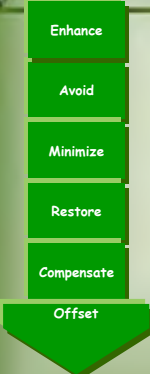
UKOTCF Biodiversity That Matters Jersey 2006 Material produced by Asha Rajwanshi and Jo Treweek through CBBIA

Mitigation of impacts on biodiversity includes any action(s) taken to avoid, reduce or eliminate adverse effects, whether by controlling the sources of impacts, or the exposure of biological receptors to them

## Mitigation options

- Alternative ways of meeting the need
- Changes in planning and design
- Improving monitoring and management
- Monetary compensation

## Mitigation hierarchy



'Anticipate and prevent' not 'assess and repair'


Take an outcome-orientated approach.

Seek opportunities to enhance or avoid impacts and ensure 'no net loss' of biodiversity as a minimum

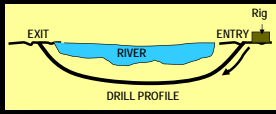
## Avoidance

- Pursue a different option
- Site based on least damage criteria
- Avoid disturbance of important/sensitive areas (e.g. protected habitat)
- Time activities to avoid critical periods (eg avoid nesting, breeding period)

## Eg alternative technological options



Recognizing the ecological benefits of Horizontal Direction Drilling technology over Open Cut method for laying pipeline across a river



(Source: WII and Bharat Petroleum Corporation Ltd)

## Timing of project activities



Location of Hazira-Bijapur-Jagdishpur gas pipeline, M.P., India

Avoid nesting, breeding period of Great Indian Bustard



## Reduction, moderation, minimization

- Substitution of techniques
- Promoting bio-friendly technologies
- Regulated access during construction or operation to control disturbance



Design of tiles to allow swift and sparrows to build nests

*contd. ...*



### Construction of fences and subways for small animal movement



(Source: The Netherlands Commission for EIA)

### Landscape planning



Raise clumps of trees in the flight path of birds to make them fly higher.

(Source: The Netherlands EIA Commission)

### Nature engineering solutions for road related impacts



### Right of Way management in transportation corridors



Perspective view of proposed eco-friendly over bridge on existing railway line and highway through Rajaji National Park

(Source: A.P. Singh)

### Alternatives at the planning stage may be useful in offsetting biodiversity losses



### Repair/ reinstate/ restore:

#### Restoration of mine overburden dumps using geo-textile



(Source: Cadli Mines, M/s Sesa Gao)

### Repair/ reinstate/ restore


#### Use of coco filters for arresting silt



(Source: SVPU, Bangalore)

### Habitat compensation

#### Creation of wetland habitat in a mine void

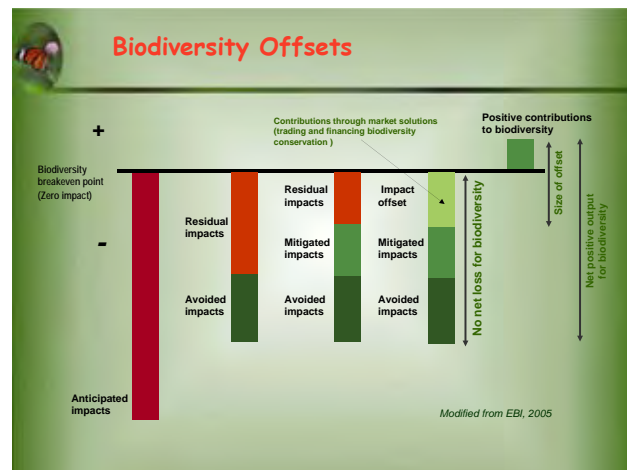


Creative management of alternative sites

(Source: M/s Narmada Cement Ltd.)

## Enhancement

- Enhance existing degraded habitats and create additional habitats to partially offset the loss of those removed by a project
- Create new habitat on alternative sites (re-vegetation of vacant lands, landfills, exposed rocks)
- Enhance habitat use and value (e.g. artificial nests for improving habitat use)



## Types of Offset activities

- Enhancing PA protection or management eg by replanting degraded areas/ strengthening management capacity.
- Safeguarding unprotected areas: entering into agreements with local communities or creating new PAs.
- Addressing underlying causes of biodiversity loss: working with communities to address livelihood needs to support alternative livelihood to stop unsustainable activities.
- Establishing corridors/ migration paths eg securing conservation management of land between PAs.
- Establishing buffer zones
- Entering into land management agreements with private land owners.

## Benefits of biodiversity offsets

### For governments

- Better balancing of costs and benefits of conservation and economic developments
- Opportunities for national governments to fulfil commitments under Millennium development goals and Convention on Biodiversity

### For developers

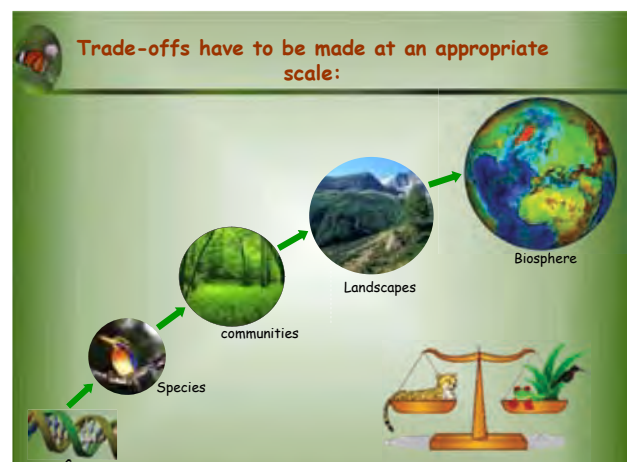
- License to operate, new market opportunities and competitive advantages

### For conservation communities

- A mechanism to reconcile conservation into development planning and biodiversity into the investment plans
- More incentives to promote in situ conservation initiatives and better conservation outcomes
- Focussing on high biodiversity value habitat and conservation priorities instead of highly compromised sites

## Ground rules for developing biodiversity offsets

- Offsets are no substitute for "no go" areas
- Offsets are not a project negotiation tool
- Offsets follow the principle of 'like for like or better'
- Biodiversity offsets should follow the mitigation hierarchy



## Country specific regulatory mechanism

### USA

- Wetland Banking in the US under the Clean Water Act 1972 and the US Army Corps of Engineers.
- Conservation Banking in the US under the Endangered Species Act and Guidance on Establishment, Use and Operations of Conservation Banks.

Developer must first avoid and then ensure restoration of prior wetlands, enhancement of low quality wetlands and creation of new wetlands.

Each hectare of wetland damaged or destroyed must be replaced

California was the first state to authorize the use of conservation banking and has established 50 conservation bank since 1995

## European Union

Habitats and Birds Directives and implementing regulations in the EU under Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora and Council Directive 79/409/EEC.

The Environmental Liability Directive makes specific reference to biodiversity and operates on the 'polluter pays principle' requiring companies to undertake compensation for environmental damage or imminent environmental damage.

No set criteria, but offsets must ensure that the overall coherence of the Natura 2000 network is protected.



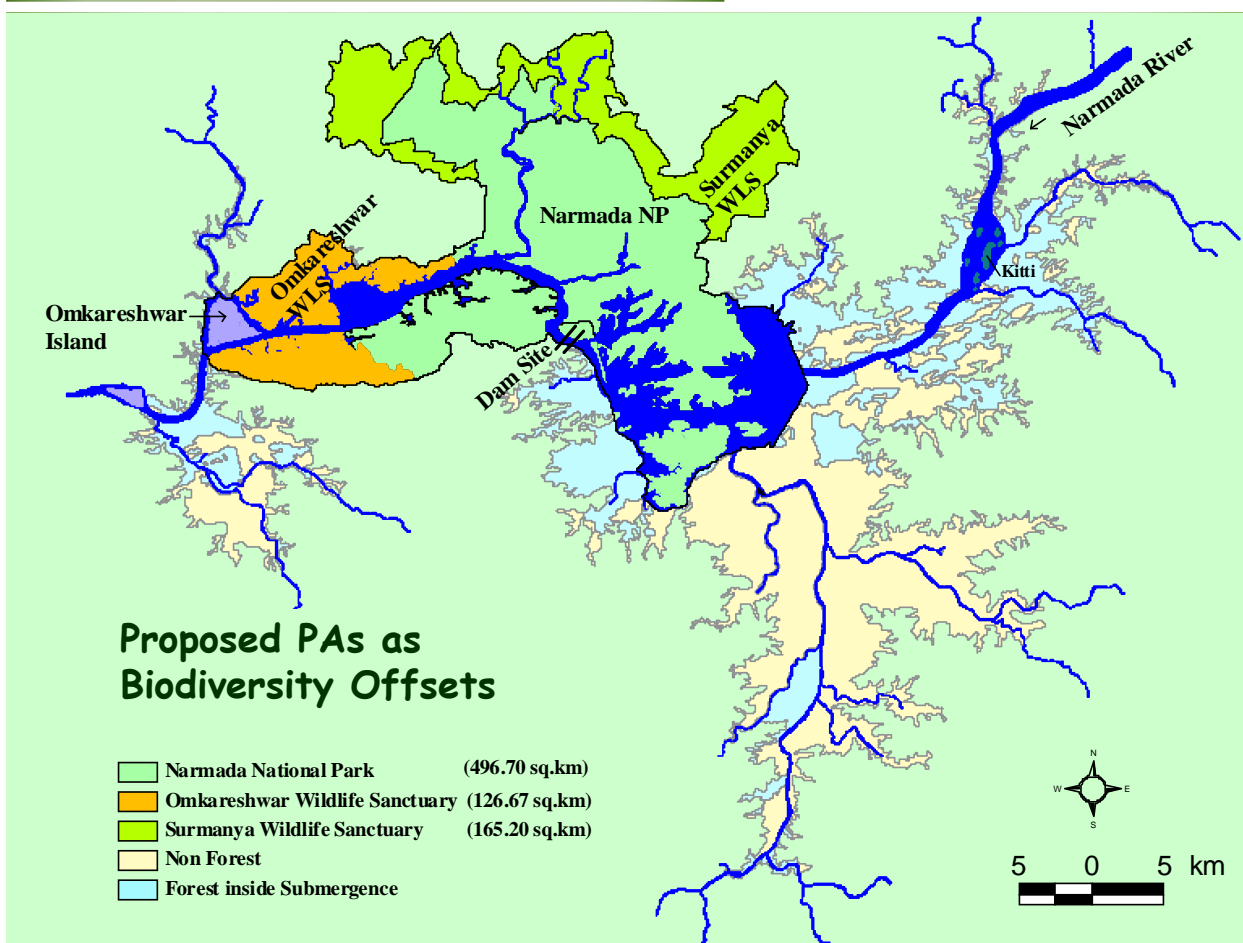
**Brazil**

Tradable Forest Conservation Obligations under the Forest Regulation and National System of Conservation Units under Lei No 4771 of 1965; Lei No 14.247 of 22/7/2002, Lei No 9.985 of 18/7/2000, Decree to No. 4.340 of 22/8/2002.

Regulation require rural property to maintain a forest reserve of at least 20%.



Where a development has a significant environmental impact, it must compensate for this by supporting a unit within a National System of Conservation Units (SNUC).

The sum paid depends on the degree of environmental impact of the project. It must be at least 0.5% the total investment costs and in rainforest areas may be above 6%.



**Features of new PA**

- ♦ All vegetation communities in submergence zone are represented
- ♦ All large mammal spp present in the project area have been recorded
- ♦ Incorporates the only residual portion of free river between Narmadasagar and Omkareshwar projects



# Environmental Impact assessment in the Marshall Islands

## EIA in Marshall Islands



## Marshall Islands

- Micronesia
- 29 low lying atolls
- 60,000 people



## RMIEPA 2003

- Strong, clear legislation for EIA and Coastal Zone Management Plans
- No experience or knowledge of EIA
- No scientific capacity to carry out EIA in-country
- Cultural/ social barriers to imposing regulations

## Approach

Capacity-building at all levels:

- Institutional
- Organisational
- Professional/ individual
- Community

## Institutional Capacity

- GIS Information System
- Coastal Zone Management Plans for 4 most developed atolls
- Develop and describe explicit EIA process and promulgate regulations

## Organisational Capacity

- EPA- experience of development and facilitation of the process- seeing the process from START to FINISH
- “Centre of Excellence” for GIS
- Private sector- worked very closely with local development proponents in partnership.

## Professional Capacity

- 2 staff and manager in EPA
- Learn by experience- by DOING on the job not by TRAINING off the job.

## Community Capacity

- Implement prescribed public information process and public hearings

## DRYDOCK!!!

- 2 months after Caleb’s arrival
- No tested process in place
- Drydock all set to go.... (\$\$\$ changed hands)

So...

Process was started- proponents required to do EIA.... Public meetings held...

## What happened?

- Public engaged powerfully- high degree of interest and care
- EIA was carried out and heavily criticised – initial project was rejected
- Social implications- employment, prostitution
- Environmental implications- lead paint, waste disposal, pollution and impact on lagoon water quality and biodiversity, aesthetic issues
- Basically- strong public discussion of issues related to these kinds of development for the first time...

## Other results of EIA

- Handling differently small developments and large developments
- Have moved 2 coral heads with endemic species
- Have established process now and changed community expectations of EPA (ie have mitigated social barriers to EPA)

## Capacity-Building

- Long-term live-in expertise
- Brings knowledge and experience
- Get to know culture and environment
- Can gain trust and develop relationships
- Is outside the social/ familial barriers
- BUT- must be the right person!
- The problem with training....

## Appendix 2. Final published programme for the conference



### **Biodiversity That Matters:** **a conference on conservation in** **UK Overseas Territories** **and other small island** **communities**

**Jersey 7<sup>th</sup> to 12<sup>th</sup> October 2006**  
(with additional workshops  
on 6<sup>th</sup>-7<sup>th</sup> and 12<sup>th</sup> October)

#### **Organised by:**

**UK Overseas Territories Conservation Forum, with the support of the Overseas Territories Environment Programme, and hosted by the Jersey conservation bodies**

Jersey will host an international environment conference from 7<sup>th</sup> to 12<sup>th</sup> October 2006, with a focus on UK Overseas Territories, Crown Dependencies and other small islands.

The conference is being organized by the UK Overseas Territories Conservation Forum in consultation with the Environmental Department of the States [Government] of Jersey, the Société Jersiaise, the National Trust for Jersey and the Durrell Wildlife Conservation Trust. It is supported by the Overseas Territories Environment Programme of the UK Foreign and Commonwealth Office and Department for International Development. It will be the fourth such conference following the first held in London in 1999, and the second in Gibraltar in 2000 and the third in Bermuda in March 2003. The proceedings of both the Gibraltar and Bermuda conferences can be seen at [www.ukotcf.org](http://www.ukotcf.org)

The conference will provide a forum for government environmental agencies and NGOs to discuss key conservation issues, to highlight success stories, exchange ideas, and to forge partnerships. It is hoped that Overseas Territories, Crown Dependencies and other small island communities that share similar environmental problems will benefit from each other's experiences and history of planning and conservation initiatives, as well as from holding the conference in Jersey.

The main topics have been determined after wide consultations amongst conservationists working in the Overseas Territories. Main sessions will be:

- Environmental education and the UKOTs
- Environmental Charters and strategic planning
- Integration of conservation and sustainable livelihoods
  - Terrestrial
  - Marine, including fisheries
- Obtaining and Using Resources (not just money)
- Species conservation issues:
  - Dealing with alien invasive species
  - Species recovery including captive breeding

The current version of the provisional programme is given later in this document and will be updated periodically on the web-site ([www.ukotcf.org](http://www.ukotcf.org)). Please note that the schedule may change up to the last minute.





To take advantage of the bringing together of persons with these interests, two optional additional workshops are being held before and after the main conference:

1. Arriving on Thursday 5<sup>th</sup> October, for a 2-day workshop on Biodiversity and Impact Assessment in Small Island States, on Friday 6<sup>th</sup> and Saturday 7<sup>th</sup> October.
2. Remaining after the conference, for a 1-day workshop on bird monitoring, on Thursday 12<sup>th</sup> October, departing on Friday 13<sup>th</sup> October.

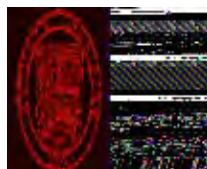
Further information on these workshops is given later in this announcement. Please note that, at the time of this revision about 9 months after the opening of bookings, these workshops have now been filled.

Participants should plan to arrive in Jersey on Saturday 7<sup>th</sup> October 2006 (unless they are attending the preceding workshop, in which case they should arrive on Thursday 5<sup>th</sup> October) and leave on Thursday 12<sup>th</sup> October (or Friday 13<sup>th</sup> October if they are attending the following workshop).

A booking form is available on the UKOTCF web-site ([www.ukotcf.org](http://www.ukotcf.org)). It is recommended that this be completed and returned as early as possible, because of limited accommodation. (If information on some parts indicated is not available by then, please return the form now and send the supplementary information later.) You will be advised as soon as possible whether a place is available.

### Acknowledgements

The organisers are grateful for contributions to the funding and other support of the conference from:  
The Overseas Territories Environment Programme of the UK Foreign and Commonwealth Office and  
the Department for International Development  
UK Overseas Territories Conservation Forum  
The Environmental Department of the States of Jersey  
The Société Jersiaise  
The National Trust for Jersey  
The Durrell Wildlife Conservation Trust  
IAIA (International Association for Impact Assessment) 'Capacity Building for Biodiversity and Impact Assessment Project' (CBBIA), funded by the Dutch Government  
Royal Society for the Protection of Birds  
The Commonwealth Foundation



### Conference venue

The conference will take place at Hotel l'Horizon, a historic but modernised hotel on the south coast of Jersey. Accommodation, meals and meetings will be held at the hotel, although a few events and the conference dinner will be held elsewhere. The hotel is situated in a biologically, historically and archaeologically interesting part of the island. Without imposing on the main programme it is planned

that optional 1-hour early morning walks for delegates who wish to explore will be organised (see below).

### Conference format

The conference will consist of several elements:

**Reviews:** Certain sessions (see programme) will be run as prepared reviews followed by discussion. If you have material that you think that the reviewer may wish to incorporate, the relevant reviewer should be contacted. Related material can also be presented as posters (see below).

**Panel discussions:** Certain sessions will be run as panel discussions (see programme). In these, panel members will be asked to present short presentations of up to 5-minutes, based on their experiences of the issue concerned, and designed to stimulate discussion. Other points can be made from the floor. Both panel and floor speakers should not range over the topic but should focus on the central issue, and particularly on aspects that went well or which caused problems. (If you want to present more information, this should be done as a poster.) Persons in the chair of each session will be instructed to keep contributions concise and stop speakers as necessary.

**Posters:** Poster presentations are not the subject of invitations, and may be offered by any participant, including those invited to make a presentation in some other form. The latter may find a poster useful to present information which does not fit readily into their spoken presentation slot.

**Summaries:** A summary of any form of presentation to be given, should be sent by email attachment to [fmmarks@btinternet.com](mailto:fmmarks@btinternet.com) by 31 July 2006 so that it can be included in the conference pack. The summary may be from a paragraph to about a page in length.

**Proceedings:** We plan to publish the proceedings on the Forum's web-site (from where proceedings of the Bermuda conference of 2003 and the Calpe 2000 conference in Gibraltar can already be downloaded). Therefore, an electronic version of any presentation should be sent to [fmmarks@btinternet.com](mailto:fmmarks@btinternet.com) before the conference for publication in this way. Alternatively, a copy on disk or CD could be brought to the conference and given to Frances Marks on **the first day** of the conference. Electronic (or scanable quality hardcopy) of illustrations should be supplied at the same time.

## Draft programme - as at September 2006 – subject to change

<b>Day -3</b>	<b>Wednesday 4<sup>th</sup> October 2006</b>
	Arrival of conference organisers. Preparatory work
<b>Day -2</b>	<b>Thursday 5<sup>th</sup> October 2006</b>
	Preparatory work continues. Arrival of EIA workshop participants Dinner
<b>Day -1</b>	<b>Friday 6<sup>th</sup> October 2006</b>
	Breakfast
	<b>2-day workshop: Biodiversity and Impact Assessment in Small Island States –</b> <b>Day 1: Biodiversity and Impact Assessment</b> (in Crystal Room East) <i>Facilitators: Dr Jo Treweek (Technical Programme Manager for a ‘Capacity Building for Biodiversity and Impact Assessment’ project) and Dr Bill Phillips (Director of MainStream Environmental Consulting and the former Deputy Secretary General of the Ramsar Convention on Wetlands, 1997-2000)</i> The main purpose of the workshop is to review capacity-building needs for biodiversity and impact assessment in Small Island States, to provide guidance on the integration of biodiversity and impact assessment (EIA and SEA) and to explore opportunities for

	<p>mainstreaming biodiversity as a key issue of concern for developers, planners and decision-makers.</p> <p>The workshop is organised by IAIA (the International Association for Impact Assessment, <a href="http://www.iaia.org">www.iaia.org</a>) through its 'Capacity Building for Biodiversity and Impact Assessment Project' (CBBIA) This project is funded by the Dutch Government and builds on work carried out by the IAIA to support the biodiversity-related global conventions, including the Convention on Biological Diversity (CBD), the Ramsar Convention on Wetlands and the Convention on Migratory Species (CMS).</p> <p>Impact Assessment (EIA and SEA) has an important role in implementing these Conventions and for helping to ensure that development is planned and implemented with biodiversity 'in mind' (eg see: <a href="http://www.biodiv.org/impactAssess/index.html">http://www.biodiv.org/impactAssess/index.html</a>)</p>
09:30	Introduction: Explanation of workshop objectives, sessions
10:00	<p>Overview of international experiences</p> <p>Review of the requirements of the global biodiversity-related conventions.</p>
10:30	Coffee break
11:00	Getting biodiversity into EIA; getting biodiversity values and services recognised in decision-making
12:30	Lunch break
13:30	Presentations by participants: experience and case studies relating to EIA/Biodiversity
16:00	Tea break
16:30	Summary: challenges for Small Island States
	Dinner
<b>Day 0</b>	<b>Saturday 7<sup>th</sup> October 2006</b>
	Breakfast
	<b>2-day workshop: Biodiversity and Impact Assessment in Small Island States – Day 2: Development planning and biodiversity (in Crystal Room West)</b>
09:00	Introduction
09:20	Working with planners. Using biodiversity objectives and targets in IA and development planning.
10:00	Tea break
10:30	Group exercise: at least 2 groups
12:30	Lunch
13:30	Feedback session
14:30	Brainstorming session: biodiversity objectives and indicators
15:30	Tea
16:00	Summing up and close
	<b>Main conference arrival day</b>
17:00-18:30	Display/poster set-up – locations will be indicated individually to those setting up displays
18:45 for 19:00	<b>Welcome reception and Opening Remarks</b> by Sir Philip Bailhache, Bailiff of Jersey Rose Lounge and the Crystal Room
19:45	Dinner
<b>Day 1</b>	<b>Sunday 8<sup>th</sup> October 2006</b>
	Breakfast
0830	<b>Conservation of the Built Heritage in the Overseas Territories</b> , including the adaptive re-use of old buildings, citing models that could be useful to UKOTs <i>Martin Drury, formerly Director-General of the National Trust, and UKOTCF Council Member</i>



0930	<b>Introduction to Jersey</b> Introduction. <i>Freddie Cohen, Minister for Planning and Environment and/or Chris Newton, Director of Environment Department, States of Jersey</i> Jersey: Environmental Challenges and Achievements. <i>Mike Freeman, Principal Ecologist, Environment Department</i> Jersey's Marine Environment. <i>Andrew Syvret, Société Jersiaise</i>
1100	Break
1130	Collect packed lunches. Coaches leave hotel
1200-1645	<b>A walk on the seabed: Jersey's first Ramsar site</b> <i>- to recover from travel; get to know other participants (a very worth-while approach on past experience); and a chance to see some of the most remarkable features of Jersey's biodiversity.</i> Jersey is within the Baie du Mont St Michel, which has one of the highest tidal ranges in the world. The conference dates happen to coincide with the most extreme tides for 4 years. This will allow a range of walks along the sea-bed at low-water. The best will be a 3-hour, 3-mile journey across one of the most unusual intertidal habitats on the planet. With each low tide, the Bailiwick of Jersey doubles in size. Take a guided walk across part of "the other half of the Crown Dependency" with marine biologist and "professional walker", Andrew Syvret (whom many will know from previous conferences) – one of the most experienced guides to this area. The south-east coast of the Island forms the last vestiges of Great Britain's land-bridge to continental Europe. Of great cultural and historical significance to Jersey-folk, this area was designated as the Channel Island's first Ramsar site in 2000. It is home to an astonishing variety of life, site of a French invasion and once upon a time proposed location for an international airport. Be prepared to get wet to the knee as you wander through boulder-fields, oyster farms, lagoons, wave-cut platforms, sand banks and saltwater-filled gullies on the way to and from one of Jersey's most interesting coastal defence towers.
1645	Coaches leave shore
1730	Coaches arrive back at hotel
1815-1845	<b>Annual General Meeting</b> of the UK Overseas Territories Conservation Forum (business meeting for member organisation representatives and Council members only) in the Whitehall Suite
1900	<b>Opening of display/poster session</b> (which will stay open until Tuesday evening) – by a <b>Reception</b> (supported by RSPB) to <b>launch the Important Bird Areas of UK Overseas Territories</b> – Rose Lounge and the Crystal Room
2000	Dinner (and more posters) – Whitehall Suite
<b>Day 2</b>	<b>Monday 9<sup>th</sup> October 2006</b>
	Breakfast; possibly optional early morning walks
	<b>Environment Charters and Strategic Planning</b> <b>Session Organiser: Dr Mike Pienkowski (Chairman, UKOTCF)</b>
0830	Introduction
0840	Review of the progress of implementation of the Charters, based on current work to develop a system to monitor this. <i>Dr Mike Pienkowski, UKOTCF</i>
0910	Panel discussion, incorporating short (3- to 5-minute) presentations from some Territories on their problems and or successes; possibly including some of: <i>TCI and the implementation of the model strategy Michelle Fulford Gardiner, TCI Department of Environment &amp; Coastal Resources</i> <i>St Helena and the application of the pilot model for strategy development Cathy Hopkins, Director, St Helena National Trust; and formerly Chair of St Helena Environment Advisory Consultative Forum</i> <i>Falkland Islands approach to developing an implementation strategy for the Environment Charter Dominique Giudicelli, Environmental Planning Officer, Falkland Islands</i>

	<p><i>Government</i>  An approach to Environment Charter implementation combining with the Organisation of Eastern Caribbean States model <i>Karim.Hodge, Anguilla Director of Environment</i>  Bermuda's biodiversity strategy implementation and its Environment Charter <i>Jennifer Gray, Bermuda Conservation Service, Bermuda Zoological Society &amp; Bermuda Audubon Society</i>  Tristan da Cunha and an approach in a territory with small human population <i>Simon Glass, Conservation Officer, Tristan da Cunha</i>  An approach to strategic environmental planning in a Crown Dependency <i>Roland Gauvain, Alderney Wildlife Trust</i>  Multilateral Environmental Agreements and UKOTs/CDs - a need for more guidance?  <i>Elizabeth Charter, Head Isle of Man Wildlife &amp; Conservation Division</i></p>		
1010	Coffee		
1040	<p>Panel discussion continues on the fulfilling of HMG commitments, incorporating 5-minute initial presentations by UK Government officials:  <i>Foreign &amp; Commonwealth Office: Helen Nellthorp, Deputy Head of Overseas Territories Department, and Shaun Earl</i>  <i>Department for International Development: Phil Mason, Head of Overseas Territories Department, and Dick Beales, Senior Natural Resources &amp; Environment Adviser</i>  <i>Department of Environment, Food &amp; Rural Affairs: Eric Blencowe, Head Zoos &amp; International Species Conservation</i>  <i>Joint Nature Conservation Committee: Marcus Yeo, Director Resources &amp; External Affairs, and Dr Vin Fleming, Head - International Unit / CITES Scientific Authority (Fauna)</i></p>		
1200	Lunch		
1300	Parallel sessions on <b>Integration of conservation and sustainable livelihoods:</b>		
	<p><b>1. Marine, including fisheries</b>  <i>Session Organiser: Dr John Cooper, Chief Research Officer, Avian Demography Unit, Department of Statistical Sciences, University of Cape Town, South Africa, and an Honorary Conservation Officer, Tristan da Cunha</i>  During 2006, the coordinator and presenters will work up a short document (see discussion documents section) that makes specific recommendations on the three themes below. It is envisaged that, if other prospective attendees wish to offer presentations on the marine issues, they submit them as posters or to link up, as much as is feasible, with any one of the three reviews below.</p>		<p><b>2. Terrestrial</b>  <i>Session Organiser: Dr Oliver Cheesman, UKOTCF Council</i>  This session will present and discuss experiences which can be broadly grouped in two areas 1) Plans, policies and partnerships - the importance of an inclusive approach; things go more smoothly if all stakeholders are involved from the start.  2) Developing infrastructure - recognising and realising natural assets; how to get the most from the physical and human infrastructure; commercialising traditional crafts and indigenous knowledge; new markets for old ideas: cash-in but keep it sustainable.  After talks and questions on each of these two areas, there will be a more general discussion on them.</p>
1300	Introduction by session co-ordinator <i>Dr John Cooper</i>	1305	Managing the impact of tourism: lessons from South Georgia <i>Gordon M. Liddle, Operations Manager, Government of South Georgia and the South Sandwich Islands</i>
1310	Review 1: By-catch issues in fisheries within UK Overseas Territories and Crown Dependency Territorial and Exclusive Economic Zone waters <i>Grant Munro &amp; Oli Yates, Falklands Conservation</i>	1325	Questions

1340	Review 2: Development issues in the inshore marine zones of UKOTs/CDs. <i>Dr Annie Glasspool, Bermuda Aquarium, Museum and Zoological Society</i>	1330	Building the TCI Biodiversity Management Plan with the local community and putting it into practice: surveying biodiversity, designing trails, recruiting guides, encouraging crafts <i>Bryan Naqqi Manco, Senior Conservation Officer, Turks &amp; Caicos National Trust</i>
		1400	Questions
1410	Tea/coffee break	1405	Tea/coffee break
1440	Review 3: The role of Marine Protected Areas in improving the conservation status of UKOT/CD territorial and EEZ waters. <i>Dr Mike Brooke, Department of Zoology, University of Cambridge, &amp; Chairman UKOTCF Pitcairn WG</i>	1435	Environmental considerations in the planning of an airport for St Helena: getting the balance right <i>Dick Beales, Senior Natural Resources &amp; Environment Adviser DFID (prepared with Isabel Peters, Environmental Co-ordinator, St Helena Government)</i>
		1455	Questions
1510	Main Discussion session, led by the coordinator and the three presenters, plus a rapporteur, acting as a panel. The pre-circulated document and the presentations will serve as starting points for the discussion, leading to conclusions and recommendations. Any agreed-upon recommendations could be put to the conference in plenary for formal adoption in the name of the conference. This document could then be used by the Forum in guiding its activities in relation to UKOT marine issues.	1500	Terrestrial biodiversity conservation in Mauritius and Rodrigues: the upscaling and mainstreaming challenge <i>John Mauremootoo, CAB International, formerly Mauritius Wildlife Foundation</i>
		1520	Questions
		1525	Further examples and discussion on the themes illustrated
1630	Session ends	1630	Session ends
1645	Coaches leave for National Trust for Jersey Historic Farm, Hamptonne		
	<b>Visit to National Trust for Jersey Historic Farm, Hamptonne</b> Tour of historic farm. The National Trust for Jersey has kindly agreed to host a “Vin d’Honneur”, a Jersey tradition, at the historic farm in the heart of Jersey’s countryside. Named after the family who lived here in the nineteenth century, the Syvret building dates from the 1830s and is the most recent of the three houses to be built. The rooms are extremely high and are typical of those found in the large houses being built in St Helier (Jersey’s capital) at this time. This building houses the exhibition <i>Living Memories</i> which tells the story of how rural life has changed in the island in the 90 years since the Great War. The northern end of this range of buildings is used as a cider barn and contains an apple crusher, a twin-screw apple press and barrels as well as other farm tools. The cider-making equipment is all in working order and is used every October to produce cider.		
	Reception and dinner		
Approx 2100	Coaches leave to return to hotel		
<b>Day 3</b>	<b>Tuesday 10<sup>th</sup> October 2006</b>		
	Breakfast; possibly optional early morning walks		
0830	Report back on previous day’s two parallel sessions.		



0930	<b>Dealing with alien invasive species</b> <i>Session Organisers: Dr Colin Clubbe (Royal Botanic Gardens Kew &amp; Vice-Chairman UKOTCF) and Dr Oliver Cheesman (UKOTCF Council)</i>
0930	Introduction and an exploration of some of the key themes identified in the discussion document in the conference pack, illustrated by a few short (5-10min) case studies. This session will also include a brief Review and Feedback from the UKOT Non-Native Review (Varnham, 2006) by Vin Fleming and Karen Varnham.
1050	Coffee
1120	Session continues with broader discussions and prioritisation brainstorming – possibly in small groups. We will conclude with a feedback/summary session and explore the way forward towards some agreement on priorities and the development of an action plan.
1240	Lunch
1340	<b>Obtaining and using resources (not just money)</b> <i>Session Organiser: Nigel Crocker (UKOTCF Treasurer)</i> A session based on short presentations and reviews, with discussions in various formats. The programme below is provisional. These will be supported also by discussion papers circulated in advance.
1340	Introduction: Outline need for resource – summary of draft overview paper to be circulated in advance
1350	Questions/comments
1355	Introduction of initiatives experience of Overseas Territories of France ( <i>Philippe Feldmann, Délégué aux ressources biologiques/ Associate Director of Research for Biological Resources, Direction Scientifique / Office of the Direction of Research, Cirad, France</i> ) and the Netherlands ( <i>Kalli De Meyer, DCNA Dutch Caribbean Nature Alliance</i> ) Co-operative initiatives in the European Union
1410	Questions/comments
1415	Government Funding – discussion on three areas of need: Big items – eg invasive eradication schemes Long term strategy – eg reserves, trails, UKOT NGOs establishment Core funding – eg UKOT NGOs
1450	Non-governmental Funding Comment: <i>Fred Burton (Cayman Blue Iguana Recovery Programme &amp; UKOTCF Council)</i> Discussion on: Need area, including: 1. Prime reserve signage and provisions 2. Small conservation publications 3. Promotional material for local educational initiatives Sources of funding, including: UK NGO membership Charitable trusts – supported by schedule being produced by <i>Ann Brown</i> , and the updating of the Forum web-site based on this.
1520	Non-financial resources: Local support - volunteers / schools / local NH clubs / military volunteers / land use <i>John Cortes (Gibraltar Ornithological &amp; Natural History Society)</i> Corporate support – internet access Sabbatical / Subject matter expert support <i>Sarah Sanders (RSPB) &amp; Colin Clubbe (RBG Kew)</i>
1550	Conclusion Introduce questionnaire to gather knowledge of support available to UKOTs for consolidation and future report on Forum web site <i>Nigel Crocker (UKOTCF Treasurer)</i>
1600	Coffee

1630	<p><b>Environmental Education and the UKOTs</b>  <i>Session Organiser: Ann Pienkowski (teacher &amp; conservationist) and Dr Juliet Rose (UKOTCF Council, and the Eden Project)</i></p> <p>A session based on short presentations and reviews, with discussions in various formats. These will be supported also by an introductory paper circulated in advance. Posters are encouraged as further examples.</p>
1630	<p><b>Introduction:</b> Summary of paper circulated in advance “<b>Good Practice for environmental education projects in the UK Overseas Territories</b>”. This will consider the following points: using a range of partners; local community participation; accessing a wide range of resources; developing a supportive teaching framework; long-term viability; creativity; generic models and approaches; wide communication and consultation. This will serve as a basis for a document to be modified as a result of discussion in the session:</p>
1645	<p>Panel discussion, stimulated by short (up to 7-minute) presentations, followed by 8 minutes of discussion time from some Overseas Territories and Jersey, on case studies, illustrating experience relevant to the above. Presentations are likely to include:</p> <ul style="list-style-type: none"> <li>- British Virgin Islands Environmental CD Atlas and Teaching Resource - <i>Nancy K. Woodfield-Pascoe (British Virgin Islands National Parks Trust)</i></li> <li>- High Schools Native Plant Nursery Project in TCI - <i>Ethlyn Gibbs Williams &amp; Bryan Naqqi Manco (Turks and Caicos National Trust)</i></li> <li>- Environment Week in Jersey - <i>John McGuinness (Le Rocquier School, Jersey and Jersey Ecology Fund Trustee)</i></li> <li>- Education Packs for the Falkland Islands and Ascension Island – <i>Ali Liddle &amp; Grant Munro (Falklands Conservation) and Tara Pelembe (Conservation Centre, Ascension Island)</i></li> </ul> <p>In addition, attention will be drawn to relevant posters, and other materials available for inspection, other people available for discussion.</p>
1800	<p>Presentation to Simon Glass of Tristan da Cunha of teaching materials produced by <i>Paul Tyler and Alison Rothwell</i> with a grant to UKOTCF by the Bryan Guinness Charitable Trust. Final discussion focussing on additions and changes to the draft document, so that this can be amended to meet the consensus view.</p>
1820	<p>Informal discussion opportunities for delegates. Nancy Woodfield-Pascoe will have the BVI CD Atlas and Teaching Resource available for inspection and trial on a laptop. Other delegates will be encouraged to bring sample materials for inspection and discussion.</p>
1840	End
1900	<b>Last chance to view poster displays</b>
2000	Dinner
<b>Day 4</b>	<b>Wednesday 11<sup>th</sup> October 2006</b>
	Breakfast; possibly optional early morning walks
	NOTE: Those with poster displays should dismantle and remove their displays during Wednesday
0830	<p>Parallel Meetings of <b>UKOTCF South Atlantic</b> and <b>Wider Caribbean Working Groups</b> (and possibly exploratory meeting on a <b>Europe Working Group</b>), including discussion on setting priorities for the Forum itself (and conference conclusions group finalise their draft in parallel)</p>
1100	Coffee
1130	<p><b>Conference conclusions</b> (<i>Co-ordinator: Dace McCoy Ground, UKOTCF Council and Bermuda National Trust</i>)</p>
1230	Lunch

1330	Coaches leave for Durrell Wildlife Conservation Trust
1400	<b>Session on species recovery including captive breeding</b> The Durrell Wildlife Conservation Trust are hosting the final afternoon and evening dinner of the Conference. Delegates will be shown the zoo, with some behind-the-scene glimpses of the work of the Trust, including the projects relating to Montserrat and Bermuda, and will be able to chat to some of the staff about their work.
1400	Sites Visits - Groups of 10 to visit the three main animals departments at the site (Mammals, Birds, Herptiles). Talks to groups by heads of departments.
1630	Tea Break at Princess Royal Pavilion
	Talks at Princess Royal Pavilion:
1700	Introduction - Durrell Wildlife Conservation Trust, vision ( <i>Mark Stanley-Price</i> )
1715	Islands and Highlands - Durrell's Conservation Programme ( <i>John Fa</i> )
	Examples of Durrell's work in UK Overseas Territories:
1730	Cayman - Blue Iguanas ( <i>Fred Burton</i> )
1745	Montserrat Biodiversity Assessment - results ( <i>Richard Young</i> )
1800	Mountain chickens in Montserrat ( <i>Geraldo Garcia</i> )
1815	General questions and discussion
1900	Dinner at the Dodo Restaurant and <b>conference closing</b>
Approx 2100	Coaches depart to return to hotel
<b>Day 5</b>	<b>Thursday 12<sup>th</sup> October 2006</b>
	Dispersal of most delegates
	<b>1-day Bird workshop for certain delegates</b> - in Crystal Room East <b>Organiser: Dr Geoff Hilton, RSPB</b> Monitoring of key bird species and sites is a crucial part of the conservation process. Some UK Overseas Territories conduct highly successful monitoring schemes, while in others there is very limited capacity to monitor birds effectively. Effective dissemination of the outcomes of monitoring programmes to decision-makers is also vitally important. In conjunction with the conference, the Royal Society for the Protection of Birds is organising a 1-day monitoring workshop, which will identify current gaps in monitoring coverage, determine how best we can share expertise and experience among Territories, and jointly ensure that the measures required to increase capacity and co-ordination of monitoring outputs are achieved.
0930	<b>Introduction to workshop</b>
0940	Presentation 1: The use of monitoring in conservation. Questions
1000	<b>What is current state of monitoring/desired level of monitoring</b>
	Flip-chart sheets on walls of what we think would be priority sites, species for monitoring in each UKOT or CD
	Presentation 2: what could/should be monitored?
	Breakout into regional groups: discuss what is and should be monitored in each UKOT or CD Report back for each Region (not each Territory)
1100	Coffee
1130	<b>What impedes monitoring?</b>
	Introduce session
	Create problem tree: impediments to successful monitoring
	Discuss and record solutions to these problems
1230	Lunch



1330	<b>Monitoring in principle and practice</b>
1355	Guest presentation: bird monitoring in Falkland Islands
1420	Presentation 3: how to design & execute a monitoring programme Questions
	Guest presentation: bird monitoring in Montserrat
1440	Tea
1505	<b>The use of monitoring data</b> Short presentation on uses e.g. indicators (15 min)
1505	Brainstorm: what could bird monitoring data in the UKOT & CDs be used for?
1530	Presentation 4: use of monitoring data
1600	Mini-presentation: State of UK's Birds, State of Europe's Birds
1610	Group discussion on what a 'State of the UKOT's Birds' report might contain
1615	<b>Developing a plan of action</b>
1615	Introduction
1620	Flipchart work in a single group: what actions should we take? Who is responsible for making it happen? By when?
1645	Wrapping-up
2000	Dinner
<b>Day 6</b>	<b>Friday 13<sup>th</sup> October 2006</b>
	Dispersal of Bird Workshop delegates

## Further notes

### 1. A walk on the seabed: Jersey's existing Ramsar site (Sunday afternoon excursion)

A 3-hour, 3-mile journey across one of the most unusual intertidal habitats on the planet. With each low tide, the Bailiwick of Jersey doubles in size. Take a guided walk across part of "the other half of the Crown Dependency" with marine biologist and "professional walker" Andrew Syvret. The south-east coast of the Island forms the last vestiges of Great Britain's land-bridge to continental Europe. Of great cultural and historical significance to Jersey folk, this area was designated as the Channel Island's first Ramsar site in 2000. It is home to an astonishing variety of life, site of a French invasion and once upon a time proposed location for an international airport. Be prepared to get wet to the knee as you wander through boulder-fields, oyster farms, lagoons, wave-cut platforms, sand banks and saltwater-filled gullies on the way to and from one of Jersey's most interesting coastal defence towers.

### 2. Morning pre-conference walks

The conference hotel is ideally placed so that delegates can explore the charming coastal areas of the south-west of Jersey. Early morning rambles will be offered for those delegates who would like some guidance and information on these areas. The early morning, before everyone is up and about, is really the best time to appreciate the beauties of the Island.

### 3. Visit to National Trust for Jersey Historic Farm, Hamptonne

The National Trust for Jersey has kindly agreed to host a "Vin d'Honneur", a Jersey tradition, at the historic farm in the heart of Jersey's countryside. Named after the family who lived here in the nineteenth century, the Syvret building dates from the 1830s and is the most recent of the three houses to be built. The rooms are extremely high and are typical of those found in the large houses being built in St Helier (Jersey's capital) at this time. This building houses the exhibition *Living Memories* which tells the story of how rural life has changed in the island in the 90 years since the Great War. The northern end of this range of buildings is used as a cider barn and contains an apple crusher, a twin-screw apple press and barrels, as well as other farm tools. The cider-making equipment is all in working order and is used every October to produce their own cider.

## Appendix 3. Participants and their contact details

Contact details, where available, of participants are given below in the sequence:

Name  
Organisation (if any)  
Address  
Telephone (T)  
Fax Number (F)  
Email address

### **Mr Charles Alluto**

National Trust for Jersey  
The Elms, La Chèvre Rue  
St. Mary JE3 3EN  
Jersey  
T +44 1534 483 193  
F +44 1534 485 434  
enquiries@nationaltrustjersey.org.je

### **Dr Steve Appleyard**

Victoria College  
Jersey  
s.appleyard@vcj.sch.je

### **Mr Timothy Austin**

Department of Environment  
P O Box 486GT  
Grand Cayman  
Cayman Islands  
T +345 9498469  
F +345 949 4020  
timothy.austin@gov.ky

### **Sir Philip Bailhache**

Bailiff of Jersey  
The Bailliff's Chambers  
The Royal Square  
St Helier  
Jersey

### **Dr Helen Baker**

Joint Nature Conservation Committee  
Monkstone House  
City Road  
Peterborough  
PE1 1JY  
UK  
T +44 1733 866816  
F +441733 555948  
helen.baker@jncc.gov.uk

### **Ms Nicole Baker**

International Centre Environmental Management  
19 Bridge Street  
Northcote  
VIC 3070  
Australia  
T +61 3 9481 7345  
F +61394817345  
nicolebaker@iprimus.com.au

### **Mr Jeremy Barker**

9 The Willows  
Shillingford St  
George  
Devon  
EX2 9QS  
UK  
T +44 7799093434  
jjfeas@hotmail.com

### **Mr Alain Baudains**

Victoria College  
Jersey  
a.boudains97@vcj.sch

### **Mr Richard Beales**

Dept for International Development  
Room 6W12  
1 Palace Street  
London  
SW1E 5HE  
UK  
T +44 2070230120  
F +44 2070230856  
R-Beales@dfid.gov.uk

### **Mr Keith Bensusan**

Gibraltar Ornithological & Natural History Society  
P O Box 843  
Gibraltar  
T +350 72639  
F +350 74022  
kbensusan@gonhs.org

### **Ms Josephine Birch**

La Société Serquaise  
Petit Moie  
Sark  
GY9 0SE  
Channel Islands  
T +44 1481 832788  
F +44 1481 832788  
birchstisted@cwgsy.net

### **Mr Eric Blencowe**

Dept of Environment, Food & Rural Affairs (Defra)  
Zone 1/10a, Temple Quay House  
2 The Square  
Bristol  
BS1 6EB  
UK  
T +44 1173728295  
F +44 117372 8373  
Eric.Blencowe@defra.gsi.gov.uk

### **Dr Quentin Bloxham**

Durrell Wildlife Conservation Trust  
Les Augrés Manor  
La Profonde Rue  
Trinity  
JE3 5BP  
Jersey  
T +44 1534 860000  
F +44 1534 860001  
Quentin.Bloxham@durrell.org

### **Dr Simon Bossy**

Planning and Environment Department  
Howard Davis Farm  
La Route de la Trinité  
Trinity  
JE3 5JP  
Jersey  
T +44 1534 441611  
F +44 1534 411601  
s.bossy@gov.je

### **Mr John Bothwell**

Cayman Islands Department of Environment  
P O Box 486GT  
Grand Cayman  
T +345 949 8469  
F +345 949 4020  
John.Bothwell@gov.ky

### **Dr Michael Brooke**

UKOTCF Pitcairn WG /University of Cambridge  
Dept. Zoology  
Downing Street  
Cambridge  
CB2 3EJ  
UK  
T +44 1223 811059  
F +44 1223 336676  
m.brooke@zoo.cam.ac.uk

**Mrs Ann Brown**  
Falklands Conservation  
1 Princes Avenue  
Finchley  
London  
N3 2DA  
UK  
T +44 208 343083  
F +44 208 343 0831  
ann@falklands-nature.demon.co.uk

**Mrs Frances Clare Buckel**  
UKOTCF Co-ordinator  
Witts End  
Radbone Hill  
Over Norton  
Oxfordshire  
OX7 5RA  
UK  
T +44 1608 644425  
fmarks@btinternet.com

**Mr Paul Buckley**  
Royal Society for the Protection of  
Birds  
The Lodge  
Sandy  
Bedfordshire  
SG19 2DL  
UK  
T +44 1767 680551  
F +44 1767 683211  
paul.buckley@rspb.org.uk

**Mr Chris Burton**  
Coutts International  
Jersey

**Mr Fred Burton**  
Blue Iguana Recovery Programme  
P O Box 10308  
Grand Cayman  
KY1 - 1003  
Cayman Islands  
fjburton@blueiguana.ky

**Mrs Linda Burton**  
Jersey

**Ms Lucinda Georgette Caesar**  
St Helena Museum  
St Helena

**Major Peter Carr**  
Royal Navy Birdwatching Society  
T +44 1869 875840  
F +44 1969875648  
pete.carr670@qcis.mod.uk

**Mr Robert Chandler**  
Bermuda Environmental Education  
P O Box SB47  
Sands  
SBBX  
Bermuda  
T +1441 335 4944  
rkchandler@ibl.bm

**Ms Elizabeth Charter**  
Isle of Man Government  
DAFF  
Knockaloe  
Patrick Peel  
IM5 3AJ  
Isle of Man  
T +44 1624 842335  
F +441624 844374  
liz.charter@gov.im

**Dr Oliver D Cheesman**  
UKOTCF Council  
108 Cholmeley Road  
Reading  
Berkshire  
RG1 3LY  
UK  
T +44 118 9265926  
oliver@dipsacus.org

**Mr Wesley Clerveaux**  
Department of Environment &  
Coastal Resources  
Lower Bight Road  
Providenciales  
Turks & Caicos Islands  
wvclerveaux@gov.tc

**Dr Colin Clubbe**  
Royal Botanic Gardens, Kew  
Herbarium  
Richmond  
TW9 3AB  
UK  
T +44 208332 5627  
F +44 2083325757  
c.clubbe@kew.org

**Mr Freddie Cohen**  
Minister for Planning and Environ-  
ment  
Jersey

**Mr Rhon Connor**  
OTEP Fellow, University of Exeter  
P O Box 1264  
The Valley  
Anguilla  
T +264 497 8826  
ifata33@yahoo.com

**Mr John Cooper**  
Avian Demography Unit, University  
of Cape Town  
Rondebosch  
7701  
South Africa  
T +27 21 650 3426  
F +27 21 650 3434  
jcooper@adv.uct.ac.za

**Dr John Cortes**  
Gibraltar Ornithological & Natural  
History Society  
P O Box 843  
Gibraltar  
T +350 72639  
F +350 74022  
jcortes@gonhs.org

**Dr Mat Cottam**  
Cayman Islands Department of  
Environment  
P O Box 486 GT  
Grand Cayman  
Cayman Islands  
T +345 949 8469  
F +345 949 4020  
mat.Cottam@gov.ky

**Mrs Beryl Crocker**  
Salida, The Street  
Ubley  
Bristol  
BS40 6PN  
UK

**Mr Nigel Crocker**  
UKOTCF Council  
Salida, The Street  
Ubley  
Bristol  
BS40 6PN  
UK  
T +44 176 1462678  
nigelberylcorax@btinternet.com

**Ms Samantha Cropper**  
Jersey College for Girls  
Jersey  
pete4ali@hotmail.com

**Mr James Daley**  
Forestry Division, Dept. of Agricul-  
ture - Montserrat  
P O Box 272  
Brades  
Montserrat  
T +1664 491 2075  
F +1664 491 8545  
etahli@hotmail.com



**Dr Charles David**  
La Société Guernesaise  
St Cergue  
Saints Road  
St Martins  
GY4 6JA  
Guernsey  
T +44 1481 238978  
cdavid@guernsey.net

**Ms Joan A De Meyer**  
Dutch Caribbean Nature Alliance  
Kaya Grandi 20  
Bonaire  
Netherlands Antilles  
T +599 717 5010  
kdm@telbonet.an

**Mr Bruce Dinwiddy**  
8 Connaught Avenue  
London  
SW14 7RH  
UK  
T +44 2088788022

**Mr Martin Drury**  
3 Victoria Rise  
London  
SW4 0PB  
UK  
T +44 2076229668  
F +44 2076229668  
martindrury@btinternet.com

**Dr Lee Durrell**  
Durrell Wildlife Conservation Trust  
Les Augrès Manor  
La Profonde Rue  
Trinity  
JE3 5BP  
Jersey  
T +44 1534 860000  
F +44 1534 860001

**Mr Shaun Earl**  
Foreign & Commonwealth Office  
Room K220  
King Charles Street  
London  
SW1A 2AH  
UK  
T +44 2070082725  
F +44 2070082879  
shaun.earl@fco.gov.uk

**Mrs Gina Ebanks-Petrie**  
Department of Environment  
P O Box 486 G T  
Grand Cayman  
Cayman Islands  
T +345 949 8469  
F +345 949 402  
gina.ebanks-petrie@gov.ky

**Mr Gavin Ellick**  
St Helena National Trust  
Broadway House  
Main Street  
Jamestown  
STHL IZZ  
St Helena  
T +290 2190  
F +290 2190  
sth.natrust@helanta.sh

**Dr John Fa**  
Durrell Wildlife Conservation Trust  
Les Augrès Manor  
La Profonde Rue  
Trinity  
JE3 5BP  
Jersey  
T +44 1534 860000  
F +44 1534 860001  
John.Fa@durrell.org

**Dr Philippe Patrick Feldmann**  
CIRAD  
Direction scientifique  
TA 179/04  
Montpellier Cedex 5  
France  
T +33 467615854  
F +33 467615657  
feldmann@cirad.fr

**Mr Calvin Fenton**  
Montserrat Centre Hills Project  
c/o Montserrat National Trust  
P O Box 393 Olveston  
Montserrat  
T +664 491 3088  
darwin@candw.ms

**Lady Eudora Fergus**  
Montserrat National Trust  
P O Box 393 Olveston  
Montserrat  
T +664 491 3086  
F +644 491 3046  
mnatrust@candw.ms

**Ms Kathryn Fleming**  
States of Jersey  
Planning & Environment Dept  
Howard Davis Farm  
La Route de la Trinité  
Trinity  
Jersey

**Dr Vincent Fleming**  
Joint Nature Conservation Commit-  
tee  
JNCC, Monkstone House  
City Road  
Peterborough  
PE1 1JY  
UK  
T +44 1733 866870  
F +44 121733 866855  
vin.fleming@jncc.gov.uk

**Mr Mike Freeman**  
States of Jersey  
Planning & Environment Dept  
Howard Davis Farm  
La Route de la Trinité  
Trinity  
Jersey  
T +44 1534 441628  
F +44 1534 441601  
m.freeman@gov.je

**Mrs Michelle Fulford-Gardiner**  
Department of Environment &  
Coastal Resources  
Department of Environment &  
Coastal Resources  
Lower Bight Road  
Providenciales  
Turks & Caicos Islands  
michellegar@gmail.com

**Ms Christine Garnier**  
Jersey Ecology Trust Fund  
Jersey

**Mr Roland Gauvain**  
The Alderney Wildlife Trust  
34 Victoria Street  
St Anne  
Alderney  
GY93TA  
Channel Islands  
T +44 1481822935  
F +44 1481822935  
manager@alderneywildlife.org

**Mrs Ethlyn Gibbs-Williams**  
Turks & Caicos National Trust  
PO Box 540  
Butterfield Square  
Providenciales  
Turks & Caicos Islands  
tc.natrust@tcway.tc

**Ms Dominique Giudicelli**  
Falkland Islands Government  
Environmental Planning Officer  
Environmental Planning Department, Malvinas Gardens  
Stanley  
F1QQ 1ZZ  
Falklands  
T +500 27 390  
F +500 27391  
djudiceli.planning@taxation.gov.fk

**Mr Simon Glass**  
Government of Tristan da Cunha  
Tristan da Cunha  
tdcenquiries@stratosnet.com

**Dr Anne Fiona Glasspool**  
Bermuda Zoological Society  
P O Box FL145  
Flatts  
Bermuda FLBX  
T +441 2934464  
F +441 2936451  
afglasspool@gov.bm

**Matt Goetz**  
Durrell Wildlife Conservation Trust  
Les Augrès Manor  
La Profonde Rue  
Trinity  
JE3 5BP  
Jersey  
T +44 1534 860000  
F +44 1534 860001

**Mr Michael Gore**  
UKOTCF Council / Chairman  
Wider Caribbean WG  
5 St Mary's Close  
Fetcham  
KT22 9HE  
UK  
T +44 1372 372248  
michaelgore@ntlworld.com

**Mrs Monica Gore**  
5 St Mary's Close  
Fetcham  
KT22 9HE  
UK

**Mrs Jennifer Gray**  
Department of Conservation Services, Bermuda Government  
Conservation Services  
P O Box FL145  
Flatts  
Bermuda FLBX  
T +441 2934464 x122  
F +441293 6451  
jagray-c@gov.bm

**Mrs Margarita (Dace) Ground**  
Bermuda National Trust /UKOTCF  
Council  
The Laurels  
6 Belvedere Road  
Paget  
DV 03  
Bermuda  
T +441 296 2327  
dace@logic.bm

**Lee Guyoncourt**  
National Trust for Jersey  
National Trust for Jersey  
The Elms, La Chèvre Rue  
St. Mary JE3 3EN  
Jersey  
T +44 1534 483 193  
F +44 1534 485 434  
enquiries@nationaltrustjersey.org.je

**Ms Nina Hall**  
States of Jersey  
Planning & Environment Dept  
Howard Davis Farm  
La Route de la Trinité  
Trinity  
Jersey

**Mr Martin Hamilton**  
Royal Botanic Gardens, Kew  
Richmond  
TW9 3AB  
UK  
T +44 208332 5441  
F +44 208332 5278  
m.hamilton@kew.org

**Mr Neil Harvey**  
National Trust for Jersey  
National Trust for Jersey  
The Elms, La Chèvre Rue  
St. Mary JE3 3EN  
Jersey  
T +44 1534 483 193  
F +44 1534 485 434  
enquiries@nationaltrustjersey.org.je

**Dr Geoff Hilton**  
Royal Society for the Protection of Birds  
c/o Sociedade Portuguesa para o Estudo das Aves (SPEA),  
Rua da Vitória nº 53, 3º Esq.  
1100-618 Lisboa  
Portugal  
T +351 213220439  
geoff.hilton@rspb.org.uk

**Dr Colin Hindmarch**  
97 Oakwell Court  
Hamsterley Vale  
County Durham  
NE17 7BE  
UK  
T +44 1207 565717  
colin@hindmarch1.wanadoo.co.uk

**Mr Karim V D Hodge**  
Ministry of Environment, Government of Anguilla  
P O Box 60  
Parliament Drive  
The Valley  
Anguilla  
T +264 497 2518  
F +264 497 3389  
karim.hodge@gov.ai

**Mr Steve Holliday**  
RSPB Central England  
46 The Green  
South Bar  
Banbury  
Oxfordshire  
OX16 9AB  
UK  
T +44 1295 676441  
steve.holliday@rspb.org.uk

**Ms Tarita Holm**  
Ministry of Resources and Development  
P O Box 302  
Koror  
96940  
Palau PW  
T + 690 4882701  
F +680 4883555  
tarita@palaunet.com

**Mrs Cathy Hopkins**  
St Helena National Trust  
Broadway House  
Main Street  
Jamestown  
STHL 1ZZ  
St Helena  
T +290 2197  
F +290 2190  
sth.nattrust@helanta.sh

**Mr Jon Horn**  
National Trust for Jersey  
National Trust for Jersey  
The Elms, La Chèvre Rue  
St. Mary JE3 3EN  
Jersey  
T +44 1534 483 193  
F +44 1534 485 434  
enquiries@nationaltrustjersey.org.je

**Mr John Hughes**  
The Old Shop  
High Street  
Shipton Bellinger  
Hants  
SP9 7UE  
UK  
T +44 1980 843467  
john@rasuk.org

**Dr Lianna Jarecki**  
H.Lavity Stoult Community College  
HLSCC Box 3097  
Road Town  
Tortola  
British Virgin Islands  
T +1 284 8527177  
F +1 284 495 1157  
ljarecki@hlsccl.edu.vg

**Dr David Jeggo**  
Durrell Wildlife Conservation Trust  
Les Augrés Manor  
La Profonde Rue  
Trinity  
JE3 5BP  
Jersey  
T +44 1534 860000  
F +44 1534 860001  
David.Jeggo@durrell.org

**Mr Will Kirby**  
National Trust for Jersey  
National Trust for Jersey  
The Elms, La Chèvre Rue  
St. Mary JE3 3EN  
Jersey  
T +44 1534 483 193  
F +44 1534 485 434  
enquiries@nationaltrustjersey.org.je

**Mr Tim Liddiard**  
States of Jersey  
Planning & Environment Dept  
Howard Davis Farm  
La Route de la Trinité  
Trinity  
Jersey

**Mr Gordon Liddle**  
Government of South Georgia & the  
South Sandwich Islands  
Government House  
Stanley  
Falkland Islands  
T +50027433  
F +50027434  
gordon.liddle@fco.gov.uk

**Mr Pati Keresoma Liu**  
Ministry of Natural Resources,  
Environment & Meteorology  
MNREM  
P O Private Bag  
Apia  
Samoa  
T +685 31197 or 31198  
F +685 23716 or 25689  
pati.liu@mnre.gov.ws

**Mr Bryan P (Naqqi) Manco**  
Turks & Caicos National Trust  
P O Box 540  
Providenciales  
Turks & Caicos  
T +649 946 7264  
F +649 941 5481  
naqqi@aol.com

**Mr Douglas Marsh**  
Akrotiri Environmental Education  
& Information Centre  
c/o J4 Registry  
HQBFC  
Episkopi  
BFPO 53  
Cyprus Sovereign Base Areas  
T +3572593763  
F +35725963066  
djmroy@aol.com

**Ms Katie Mason**  
Jersey College for Girls  
Jersey  
kt\_mason@hotmail.com

**Mr Philip Mason**  
Dept for International Development  
Room 6W13  
1 Palace Street  
London  
SW1E 5HE  
UK  
T +44 2070230293  
F +44 2070230856  
PS-Mason@dfid.gov.uk

**Dr John Mauremootoo**  
CABI  
CABI Africa  
P O B 633 - 00621  
Nairobi  
Kenya  
T +254 207224450  
F +254 207122150  
j.mauremootoo@cabi.org

**Mr John McGuinness**  
Le Rocquier School & Jersey Ecology Fund  
Jersey  
jjmcguinness@yahoo.co.uk

**Ms Emily McKenzie**  
Joint Nature Conservation Committee  
Monkstone House  
City Road  
Peterborough  
PE1 1JY  
UK  
T +44 1733 866918  
F +44 1733 555948  
emily.mckenzie@jncc.gov.uk

**Ms Julia Meldrum**  
States of Jersey  
Planning & Environment Dept  
Howard Davis Farm  
La Route de la Trinité  
Trinity  
Jersey

**Mr Stephen Mendes**  
Montserrat Centre Hills Project  
c/o Montserrat National Trust  
P O Box 393 Olveston  
Montserrat  
T +664 491 3088  
darwin@candw.ms



**Ms Clare Miller**  
South Atlantic Invasives Species  
Programme  
c/o RSPB  
The Lodge  
Sandy  
Bedfordshire  
SG19 2DL  
UK  
T +32497464566  
clare.a.miller@googlemail.com

**Dr Niall Moore**  
CSL (Defra)  
CSL  
Sand Hutton  
York  
YO41 1LZ  
UK  
T +44 1904 462062  
F +44 1904 462111  
n.moore@csl.gov.uk

**Dr Diana Mortimer**  
Joint Nature Conservation Commit-  
tee  
Monkstone House  
City Road  
Peterborough  
PE1 1JY  
UK  
T +44 1733 866857  
F +44 1733 555948  
diana.mortimer@jncc.gov.uk

**Ms Jo Moss**  
Jersey College for Girls  
Jersey  
j.moss@jcg.sch.je

**Ms Farah Badrudin Mukhida**  
Anguilla National Trust  
P O Box 1234  
The Valley  
Anguilla  
T +264 4975297  
F +264 497 5571  
antpam@anguillanet.com

**Mr Grant Munro**  
Falklands Conservation  
P O Box 26  
Stanley  
FIQQ 1ZZ  
Falkland Islands  
T +500 22247  
F +500 22288  
grant.munro@conservation.org.fk

**Ms Helen Nellthorp**  
Foreign & Commonwealth Office  
UK  
c/o Shaun Earl

**Mr Chris Newton**  
Director of Environment Depart-  
ment, States of Jersey  
Jersey

**Mr Iain Orr**  
UKOTCF Council  
12 Otto Close  
London  
SE26 4NA  
T +44 20 8693 3584  
biodiplomacy@yahoo.co.uk

**Mr Jean-Philippe Palasi**  
IUCN Regional Office for Europe  
Brussels  
Belgium  
jean-philippe.palasi@iucn.org

**Mrs Janice Panton**  
Montserrat Government UK Office  
7 Portland Place  
London  
W1B 1PP  
UK  
T +44 207031 0317  
F +44 207031 0318  
j.panton@montserratgov.co.uk

**Mr John Parkes**  
Landcare Research  
P O Box 69  
Lincoln  
8152  
New Zealand  
T +64 3325 6700  
parkesj@landcareresearch.co.nz

**Mr Jon Parkes**  
National Trust for Jersey  
National Trust for Jersey  
The Elms, La Chèvre Rue  
St. Mary JE3 3EN  
Jersey  
T +44 1534 483 193  
F +44 1534 485 434  
enquiries@nationaltrustjersey.org.je

**Ms Gemma Parlett**  
Jersey  
gemmaparlett@hotmail.com

**Mr Fred Pearce**  
New Scientist Magazine  
40 Crieff Road  
London  
SW18 2EA  
UK  
T +44 2088741189  
pearcefred@compuserve.com

**Mr Jonathan Pearse**  
NIRAS Consultants  
Mustafe Busaladzica 41  
Sarajevo  
Bosnia & Herzegovina  
T +387 33440360  
jonathanpearse@hotmail.com

**Mrs Tara Pelembe**  
Ascension Island Government Con-  
servation Department  
Conservation Department  
AIG  
Georgetown  
ASCN 1ZZ  
Ascension Island  
T +247 6359  
F +247 6359  
tara.pelembe@ascension.gov.ac

**Mr Charles Perez**  
Gibraltar Ornithological & Natural  
History Society  
P O Box 843  
Gibraltar  
T +350 72639  
F +350 74022  
cperez@gonhs.org

**Dr Bill Phillips**  
MainStream Environmental Con-  
sulting  
Australia  
T +61 262817470  
mainstream@mainstream.com.au

**Dr Richard Phillips**  
British Antarctic Survey  
High Street  
Madingley Road  
Cambridge  
CB3 0ET  
UK  
T +44 1223 221610  
F +44 1223221259  
raphil@bas.ac.uk

**Ms Sophie Pickup**  
Jersey College for Girls  
Jersey  
s.pickup96@jcg.sch.je

**Mrs Ann Pienkowski**  
UKOTCF volunteer  
102 Broadway  
Peterborough  
PE1 4DG  
UK  
T +44 1733 569325  
F +44 1733 569325  
apienkowski@clara.co.uk

**Dr Mike Pienkowski**  
UKOTCF Chairman  
102 Broadway  
Peterborough  
PE1 4DG  
UK  
T +44 1733 569325  
F +44 1733 569325  
pienkowski@cix.co.uk

**Mr Alex Pinel**  
Victoria College  
Jersey

**Ms Dorcas Roberts**  
Bermuda National Trust  
P O Box HM61  
Hamilton HMAV  
Bermuda  
T +4412366483  
F +4412360617  
dorcas@bnt.bm

**Dr Juliet Rose**  
UKOTCF Council  
Eden Project  
Bodelva  
St Austell  
Cornwall  
UK  
T +44 1225835698  
jrose@edenproject.com

**Mr Frank Roulstone**  
National Trust for the Cayman  
Islands  
P O Box 31116  
SMB  
Grand Cayman  
Cayman Islands  
T +345 949 0121  
froulstone@nationaltrust.org.ky

**Dr Sugoto Roy**  
Ecologist Invasive Species  
Drinishade School House  
Harris  
HS3 3DX  
UK  
T +44 1904 462000  
s.roy@csl.gov.uk

**Ms Tupe Samani**  
Department of Environment, Tonga  
P O Box 917  
Nuku'alofa  
Tonga  
T +67625050  
F +67625051  
tupetupei@yahoo.com

**Ms Sarah Sanders**  
Royal Society for the Protection of  
Birds  
The Lodge  
Sandy  
Bedfordshire  
SG19 3JH  
UK  
T +44 1767 680551  
F +44 1767 783211  
sarah.sanders@rspb.org.uk

**Mr Piers Sangan**  
Victoria College  
Jersey  
lebourg@jerseymail.co.uk

**Dr Samia Sarkis**  
Department of Conservation Serv-  
ices  
P O Box FL145  
Flatts  
FLBX  
Bermuda  
T +1441 2932727  
F +1441 2936451  
scsarkis@gov.bm

**Dr Eric Shaw**  
Gibraltar Ornithological & Natural  
History Society  
18 Gavino's Dwelling  
Gibraltar  
T +330 58832000  
helpinghand@gibnet.gi

**Mr Joseph Smith Abbott**  
BVI National Parks Trust  
P O Box 860  
Road Town  
Tortola  
British Virgin Islands  
T +2844943904  
F +2844946383  
director@bvinationalparkstrust.org

**Ms Noeleen Smyth**  
Dept of Botany Trinity College  
Dublin & BEC Consultants  
Trintiy College Dublin  
Dublin 2  
Ireland  
T +353 86 8561693  
nsmyth@tcd.ie

**Ms Louise Soanes**  
Alderney Wildlife Trust  
St Anne's  
Alderney  
ecology@alderneywildlife.org

**Ms Mary Sparks**  
3 Gallows Gore  
Worth Matravers  
Swanage  
Dorset  
BH19 3JR  
UK  
muds2@student.open.ac.uk

**Dr Mark Stanley Price**  
Durrell Wildlife Conservation Trust  
Les Augrés Manor  
La Profonde Rue  
Trinity  
JE3 5BP  
Jersey  
T +44 1534 860000  
F +44 1534 860001  
Mamk.StanleyPrice@durrell.org

**Mr Andrew Syvret**  
Société Jersiaise  
Le Galetas  
Haut de la Rue  
Leoville  
St Ouen  
Jersey, CI,  
JE3 2DB  
Jersey  
T +44 1534 485201  
andrew@seajersey.com

**Senator Stuart Syvret**

Minister of Health and Social  
Services  
Peter Crill House  
Gloucester Street  
St Helier  
JE1 3QS  
Jersey  
T +44 1534 610833  
F +44 1534 505891  
st.syvret@gov.je

**Mr Rob Thomas**

Royal Zoological Society of Scot-  
land  
134 Corstorphine Road  
Murrayfield  
EH12 6TS  
UK  
T +44 131 3140345  
F +44 131 3140376  
rthomas@rzss.org.uk

**Dr Jo Treweek**

International Association for Impact  
Assessment  
Chancery Cottage  
Kentisbeare  
Cullompton  
Devon  
EX15 2DS  
UK  
T +44 1884 266798  
jo@treweek.fsnet.co.uk

**Dr Erik van Zadelhoff**

IUCN Regional Office for Europe  
Boulevard Louis Schmidt 64  
Brussels  
1040  
Belgium  
T +32 2 7328299  
F +33 2 7329499  
erik.van.zadelhoff@iucn.org

**Ms Lynda Varlack**

Conservation & Fisheries Dept.  
Government of the BVI  
P O Box 3323  
Road Town  
Tortola  
British Virgin Islands  
T +1 284 494 5681  
F +1 284 494 2670  
lvarlack@gov.vg

**Ms Karen Varnham**

42A Albert Park Place  
Montpelier  
Bristol  
BS6 5ND  
UK  
T +44 7816362635  
kjvarnham@btopenworld.com

**Ms Aimée Vibert**

Beaulieu Convent School  
Jersey  
aimeevibert@googlemail.com

**Ms Emma Voak**

Jersey College for Girls  
Jersey  
e.voak96@jcg.sch.je

**Mr Paul Wagstaffe**

States of Jersey  
Planning & Environment Dept  
Howard Davis Farm  
La Route de la Trinité  
Trinity  
Jersey

**Ms Harriet Whitford**

Durrell Wildlife Conservation Trust  
Graystons  
Mont Gras d'Eau  
St Brelade  
JE3 8ED  
Jersey  
harriet.whitford@durrell.org

**Ms Nancy Woodfield-Pascoe**

BVI National Parks Trust  
P O Box 860  
Road Town  
Tortola  
British Virgin Islands  
T +284 494 3904/2069  
F +284 494 6383  
nkwoodfield@yahoo.com

**Mrs Kedell M Worboys**

St Helena Government UK Repre-  
sentative  
Suite G4  
7 Portland Place  
London  
W1P 1PP  
UK  
T +44 20 7031 0314  
F +44 20 7031 0315  
shgukrep1@btconnect.com

**Mr Marcus Yeo**

Joint Nature Conservation Commit-  
tee  
Monkstone House  
City Road  
Peterborough  
PE1 1JY  
UK  
T +441733 866897  
F +44 1733555948  
Marcus.Yeo@JNCC.gov.uk

**Dr Glyn Young**

Durrell Wildlife Conservation Trust  
Les Augrés Manor  
La Profonde Rue  
Trinity  
JE3 5BP  
Jersey  
T +44 1534 860000  
F +44 1534 860001  
Glyn.Young@durrell.org

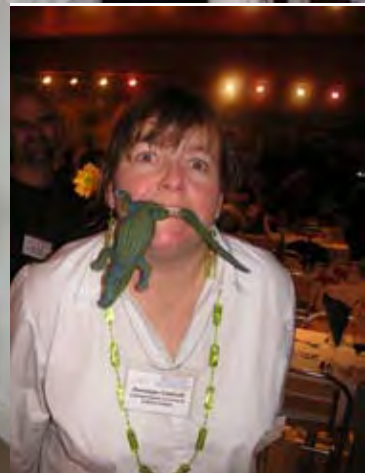
**Dr Richard Young**

Durrell Wildlife Conservation Trust  
Les Augrés Manor  
La Profonde Rue  
Trinity  
JE3 5BP  
Jersey  
T +44 1534 860000  
F +44 1534 860001  
Richard.Young@durrell.org





*Informal discussions, team-building and various tastings*



## Appendix 4. Feedback from participants

Based on a collation by Frances Marks, UKOTCF

### Introduction

UKOTCF has never assumed that the conferences are a series continuing indefinitely, but that each one must fill particular needs. To try to secure a wider view, a questionnaire “We need to hear from you!” was again included in the conference pack. Throughout the conference and immediately after, participants were encouraged to complete and return these. 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.

Thirty-two feedback questionnaires were returned, either left at the conference or sent in after being reminded. This response of about 30% to a questionnaire is a very 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 depends 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). It is generally believed that people only respond to questionnaires when they have a strong motive to do so. If people are generally satisfied then they do not bother to fill in a questionnaire. Although this probably does not apply in full in the present case, it could have some effect. Therefore it should be recognised that a bias could be interpreted in responses as the analysis is based on responses expressed by about 30% of participants. Most of the recipients did not answer all questions. For these reasons, it is not meaningful (and in some cases not possible) to give percentages to individual sections.

**1. Please indicate, for any of the following sessions, any aspects 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.**

#### **A) Pre-conference workshop on Biodiversity and Impact Assessment in Small Island States**

The majority of those attending who responded to the questionnaire said it was a well structured, informative and a useful session. It gave good information on EIA and MEAs and it was interesting to note ways EIA was implemented (or not) in various areas. Equal numbers felt that the role play gave good insight to those who felt it was less productive. It was felt that it would be a good idea to have a follow up on practical analysis of EIA at the next conference.

#### **B) Posters and displays**

Posters were generally thought to be helpful and provided valuable insight into the work undertaken at various UKOTs and UK-based organisations. They gave those who were not giving a presentation a chance to show their work and the

high standard of presentation and photography was noted. However some doubted that participants had the time to read all the posters and felt that it would have been more advantageous to have had all the posters together and not spread out in three rooms. It was suggested that time should have been dedicated where poster authors could have stood by their poster so that others could have asked questions.

Several participants noted that they would be pursuing methodologies presented via posters and that contacts from the posters would be useful. Handouts had been helpful and it was hoped that the posters would be part of the web pages for the conference proceedings. [They have been if authors supplied them, as requested in the conference announcements and messages.]

### **C) Introduction to Jersey and conference initiation by field visit**

This session was deemed to be extremely useful. The Introduction by the Bailiff of Jersey was excellent, and the speeches being focused afforded participants to get an introduction without being overwhelmed with many presenters. Technical discussions on Jersey were good and also provided a good insight into the area. All respondents thought that the walk on the Jersey Ramsar site was fantastic and Andrew Syvret's passion for the site was tremendous. As planned, it allowed delegates to get to know each other and have informal discussion, time for this being too limited during most of the rest of the conference.

### **D) Environmental Charters and strategic planning**

This session was perceived as being informative and useful. However less than half those who returned a questionnaire responded to this question. A theme that has appeared throughout many of the sections of the questionnaire was that there were too many presentations and not enough time for discussion. It was suggested that it might have been possible to have circulated the information on the status of Environmental Charter implementation before the session [it was so included in the conference handbook supplied at registration] so that a more structured discussion could have resulted on why progress was not being made and what could be done to make progress, which might have resulted in more participation from the floor and action points that could have

been taken forward after the conference. The session provided food for thought, and some enthusiasm for measuring performance of Charter implementation.

The next two sessions were those that were run in parallel so fewer comments were received as participants only attended one of the sessions.

### **E) Integration of conservation and sustainable livelihoods: 1. Marine, including fisheries**

Many of those who attended the parallel session said they would have liked to attend both sessions. However, the short reports back from each of the parallel sessions and the earlier EIA workshop were considered useful.

Marine and fisheries were considered to be key issues for many territories, and those who attended indicated that they learnt from the well presented talks. However, because this was considered to be such an important and large issue it was felt that there was too much to cover and too little time for discussion. Territories needed more help in this area and this issue should be kept as a priority and followed up.

### **F) Integration of conservation and sustainable livelihoods: 2. Terrestrial**

This was a well-attended and well-presented session; the majority felt there was a good choice of speakers and subjects. However, there were few responses to this section of the questionnaire with a few who found that there were elements of the session that were not clear, and that there was not enough discussion time. It was thought that territories needed to move forward to agree actions that were achievable.

### **G) Dealing with alien invasive species**

Participants generally thought that this topic was very useful and provided a context of the work currently being undertaken and some of the tools at their disposal to share information regarding the extent of the problem. It was considered to be a very large subject, one of the major issues facing all countries, not just UKOTs. Therefore one that needed to be dealt with in greater depth, with more discussion and the need to see more practical methodology in dealing with widespread invasives. It was apparent that participants wanted to share the knowledge between them and make



sure that more information regarding threats and opportunities for future management became available.

It was suggested that at the next meeting it would be useful to compare ways of tackling the invasive species problem to see if different tools and techniques could be applied in different territories, demonstrate successes with visual aids and provide a direction towards solutions. This would provide an effective tool that could be adopted by all.

#### **H) Obtaining and using resources (not just money)**

Generally participant said this had been a very useful session with good examples being used showing what could be achieved. The presentation from Gibraltar was singled out as excellent and motivating and Territories, particularly in the Caribbean, thought that it was interesting to learn about how volunteer resources could be used. However, some respondents felt that presentations did not address some of the structural issues that UKOTs face when trying to access large-scale funding. This matter continued to be unresolved and participants felt that HMG had not provided any new insight into how UKOTs could overcome some of the shortfalls in funding for environmental conservation and historical preservation.

Some participants made the plea for a 'manual' or a database of funding opportunities. Who has the funds, who can apply, how much, what for, deadlines, etc? Small island agencies and NGOs lack the capacity to research this information. [This had originally been planned, but was not achieved due to the original volunteer organiser of the session not completing work and a replacement having to take over at short notice.]

#### **I) Environmental Education and the UKOTs**

Of those who responded, without exception, this was considered to be a very useful session and participants were interesting to see the approaches employed by various UKOTs. The highlight of the session was undoubtedly the presentation from the British Virgin Islands on their newly developed CD for schools packed with local and global information. This part of the conference highlighted the huge need for children in overseas territories to have curricula developed and integrated for them including information on their local environment. The only adverse comment

about this session was that it was a pity that it was at the end of a long tiring day.

#### **J) Regional Working Group meetings**

Comments for this session were very positive.

There were mixed views from those attending the South Atlantic Working Group, with some impressed by the structure parts of the meeting, and others concerned that some important aspects on the agenda were not allowed time because of over-run of earlier items.

Wider Caribbean Working Group participants also found their meeting to be useful in order to set priorities and define a future agenda.

For both meetings it was thought that more time should have been afforded to discuss issues. Some participants found the meetings to be a new experience, having been unaware of such groups, but they found participation useful and stimulating.

Those who responded who had attended commented that it was an excellent opportunity to set up the Europe Territories Working Group that seemed to instantly have a sense of direction and identified specific items that could be tackled. However, it would need to be regularly maintained and contact kept among the groups.

#### **K) Species recovery including captive breeding, and closing activities at DWCT**

Of those who responded to this question they found the experience useful and thought that generally Durrell were doing some good work. Some would have like a more formal approach to the afternoon [which had been the original plan] while others enjoyed the freedom to wander at their own pace. It was thought however, that there was a missed opportunity to promote the UKOTs more at the exhibits of UKOT species. But these small niggles were well offset by a splendid and most sociable evening, which was thoroughly enjoyed and deemed to be a fitting climax to the conference.

#### **L) Bird-monitoring workshop (if attended)**

There were few responses to this part of the questionnaire. Of those who commented most found the workshop to be of interest, useful and relevant. However the majority also noted that

there were too many presentations, some were rushed, and there was not enough participation from the floor.

**M) Other elements (e.g. Opening, Conservation of the Built Heritage in the Overseas Territories, Reception and book launch, Optional early morning walks, Visit to Historic Farm, informal meetings, etc)**

Other activities were well received and were thought to be useful and enjoyable. In particular, most appreciated the good way to get discussion going through social events giving an opportunity to discuss key issues outside formal session.

There were a few mentions that it was good to have a presentation on built heritage, which had been a neglected area. This and the visit to Hamptonne afforded a welcome diversion and a chance for informal discussion.

Some respondents felt that the formal conference programme was too intensive at times, and many would have welcomed a bit more flexible time for bilaterals.

It was noted that it was good to have EU representatives present.

The icing on the cake was undoubtedly the walking on the Ramsar site. This, together with the overall organisation and smooth running of the conference, resulted in a successful event.

**2. 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 topics 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 organized, what topics would you like to see addressed (whether included this time or not)?**

This question generated as many ideas for future topics as those who responded. They can be grouped into various categories, very much along the lines discussed in Jersey:

Conservation: this included Biodiversity Action plans, both marine and terrestrial; global strategy for plant conservation; threatened species

research; biological recording and monitoring; species/habitat rehabilitation; EIA; and sustainable tourism. Several respondents requested the effects of climate change, and climate change issues.

Invasive Species: Several respondents mentioned invasive species as a major topic, to include species control methods with more in depth discussion.

Funding: Funding sources, with potential funders attending, how the bidding process worked, the application process and possible funders.

Capacity building: Longer and more in depth sessions including training; NGO management training; strategic planning; financing mechanisms for organisations; developing the volunteer base; information sharing and networking initiatives.

Environmental education: A more in-depth look at the differences and similarities in the schools curricula and guideline document produced from the conference.

A number of respondents felt it was important to monitor if any progress had been made from the Jersey meeting.

**3. To allow us to fit in more topics, we experimented with parallel sessions at the conference. What are your views on parallel sessions in a conference of this type?**

The parallel sessions appear to have worked well in view of the subject areas selected. Although respondents felt that there were obvious advantages and disadvantages it was felt that they were good in theory. Parallel sessions afforded the chance for everyone to select that area which was of greatest interest to them or, in the cases where delegations were made up of multiple individuals, they could split their participation and maximise the opportunity to gain the information which was then shared.

Equal numbers of respondents would prefer not to have parallel session; those who only had one departmental representative particularly mentioned this.

Provided that such sessions are not on subjects of generic interest to all, but selected according to more disparate interests then this approach would

appear to be acceptable.

**4. Do you think that a conference of this nature is sufficiently useful so that another might be organized 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).**

All respondents said that conferences of this nature were useful and some said they were fundamental in gauging the progress of territories, providing direction and expertise. A number added that it was vital for the UKOTs to get together to discuss issues of mutual interest. Many felt that a 3-year period was a good interval between conferences, although some wanted conferences to be more frequent. It was suggested that regional meetings or focused workshops tackling a smaller range of topics in more depth could be held between conferences, thus allowing more time for discussion.

**5. 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.**

The majority of respondents felt that the Forum should continue to lobby HMG and EU on behalf of the UKOTs acting as a spokesperson for the UKOTs [or at least the NGOs in the UKOTs]. Some member organisations felt that, where they were constrained, the Forum could exert more influence in pushing environmental agendas at the local level. Some help in providing interpretation of UK and EU legislation would be appreciated.

Improving communications and dissemination of information was considered important. This could be achieved with the use of the Internet, web-cams and through the working groups. A more consultative approach should be considered beyond the reporting of immediate issues within UKOTs. The Forum was asked to consider whether the use of web-cams could be made, so that consultative meetings between HMG and UKOTCF might be broadcast allowing UKOT participation in the actual deliberations.

Several respondents requested that the Forum continues to keep the UKOTs and CDs in the public eye, and raise the profile of UKOT issues. Others requested help in funding application or seeking resources.

**6. What do you think should be the most helpful things that the UK Government should try to do to help its member organisations and other conservation partners (including governments) in the UK Overseas Territories.**

More than half of those who responded to the questionnaire felt that funding was one of the most important commitments that HMG needed to fulfil. There was a request for clarity regarding the financial tools, which may become available beyond small scale funding currently available through OTEP. In particular, it was considered that there was a huge gap where large scale funding was concerned. Funding provision for providing the local expertise badly needed in conservation especially in the areas of EIA, biodiversity conservation, GIS, database use, web design and maintenance was required, as well as updates on what education scholarships and grants were available to school children and adults in the territories.

Respondents wanted a fuller distribution of information from Government to the UKOTs, highlighting who in government positions was able to help, with a continual update of who was in what position, particular in regard to the application process and in obtaining funding for projects. They also wanted HMG to listen and liaise with the UKOTs more and would like policy changed so that DCMS supported the UKOTs more fully.

**7. What do you think that you will do differently as a result of attending this conference?**

There were a number of individual remarks to this section of the questionnaire. Making more effort to keep in touch with other participants and the Forum was the most important issue mentioned. By doing so, it was felt that participants would have more confidence and feel less isolated about tackling issues.



**8. If you attended the Bermuda Conference (or the Gibraltar one) what did you do differently as a result of attending that conference? If you can remember, was it what you said in answer to the previous question last time?**

There were few responses to this question, but those who did respond felt that they had been able to network better with other UKOTs and had been made more aware of other UKOT issues.

**9. Any other comments**

One point that was mentioned by a few delegates was in reference to the choice of hotel. Although the luxury of the hotel was appreciated by many, some wondered if as environmentalists we were giving out the right kind of message by staying at a luxury hotel, which did not appear to have

a greening policy and it was considered that participants should minimise their environmental footprints for future conference. [There is, in fact, very little choice as to hotels which can cope with this sort of meeting.]

However by far the majority who responded to this part of the questionnaire generated the feeling that overall the conference had been productive and an outstanding success being a credit to all involved, as it was well organised so it had run smoothly. It was felt to be refreshing and stimulating to have many like-minded persons together as one unit, and that the benefits of such interaction should not be underestimated. The idea of linking with the schools and involving young people who took an active part in the conference was also considered excellent. It was felt that it is important that the momentum gained from such an event should not be lost.



*Traditional Jersey view*

## **Appendix 5. Friends of the UK Overseas Territories**

The UK Overseas Territories Conservation Forum works to help local partner organisations in the UK Overseas Territories and Crown Dependencies conserve their natural and cultural heritage for the benefit of present and future generations - as a global responsibility, for the quality of life, and as the basis of the future economy, safety and health.

Individuals and organisations can support the work of UKOTCF, and receive its publications regularly, by becoming Friends of the UK Overseas Territories. A form for this will be found on the next page.

# Friends of the UK Overseas Territories



How does the Forum work to conserve the treasure trove of biodiversity found in the Overseas Territories?

- By supporting local people in their efforts to conserve their own environmental resources
- By helping non-governmental organisations (NGOs) find international funding for their work
- By providing strategic assistance to the Overseas Territories, both governments and NGOs
- By coordinating the support of UK member bodies in providing specialised technical assistance to enable local people to carry out conservation projects
- By raising awareness in the UK about the Overseas Territories and our responsibility to them
- By providing regional support by expert Working Groups
- 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 for the year: ☐ £15 ☐ £50 ☐ £100 ☐ £500

I wish my company to become a Corporate Friend at the following support level for the year: ☐ £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 \_\_\_\_\_

Please complete one of options 1 to 3 below. UK taxpayers are requested to complete section 4 also; this will allow UKOTCF to benefit from the tax you have paid, at no additional cost to you.

1: ☐ I enclose my cheque made out to UKOTCF for this amount.

2: Please debit my UK bank account immediately and annually on (insert day and month) \_\_\_\_\_ with the amount indicated above until further notice.

Name of Bank \_\_\_\_\_ Sort Code \_\_\_\_\_ Account Number \_\_\_\_\_

Account Name \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

3: Please charge the amount indicated above to my card: (if you are based in another country, your card company will handle the exchange and include the equivalent in your own currency in your regular statement)

☐ American Express ☐ Delta ☐ JCB ☐ MasterCard ☐ Solo ☐ Switch/Maestro ☐ Visa

Card Number:                 Expiry date: / (month/year)

Security Number (3 digits, or 4 for AmEx): \_\_\_\_\_ If used: Start Date / Issue number \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

4: UK Taxpayers are requested to complete the following section to allow UKOTCF to recover tax paid:

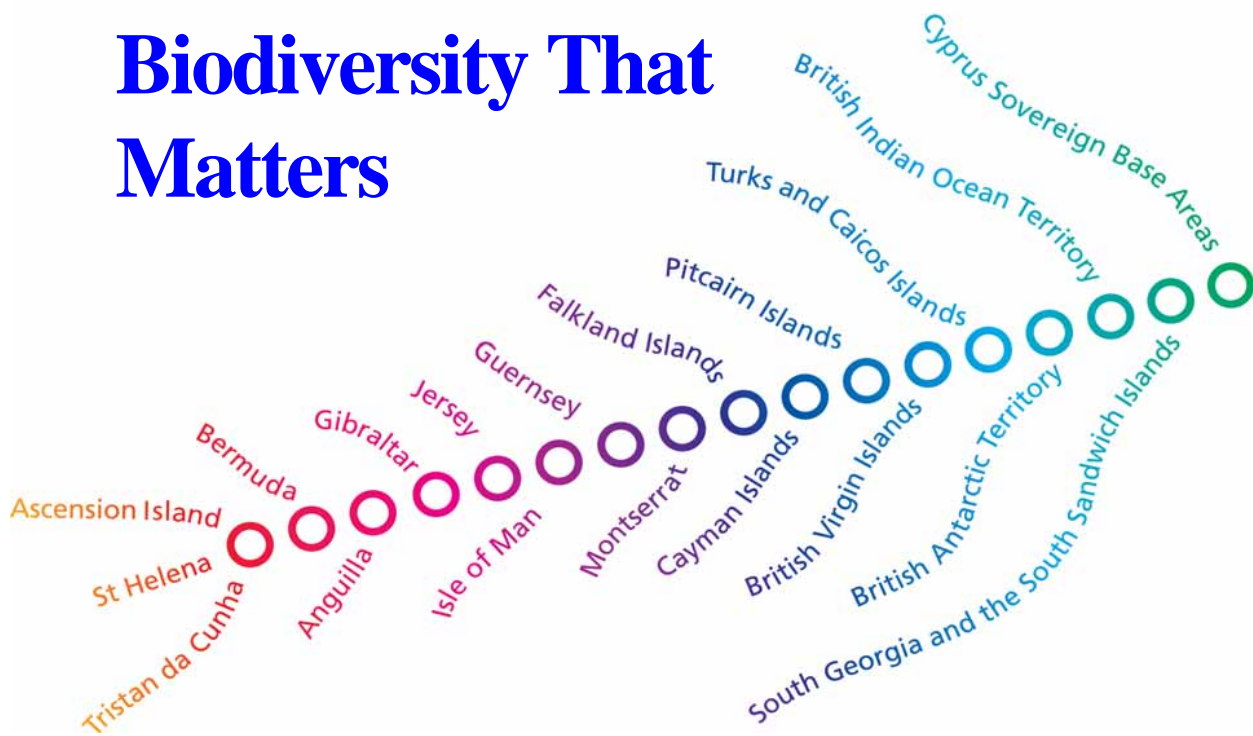
I want this charity to treat all donations that I make from the date of this declaration until I notify you otherwise as Gift Aid donations.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Send to UKOTCF, 12b High Street, Wendover, Bucks, HP22 6EA, UK; if using card, you can fax to +44 1733 569325



# Biodiversity That Matters



a conference on conservation in UK Overseas Territories  
and other small island communities

Jersey 6<sup>th</sup> to 12<sup>th</sup> October 2006

